NXTBLOC®
AUTOCLAVED AERATED CONCRETE BLOCKS

Product By
BIGBLOC CONSTRUCTION

BUILD STRONG

BUILD SMART

With NXTBLOC AAC Blocks

www.bigbloc.in

Introduction to AAC Blocks

Originating with Swedish Architect Dr Johan Axel Eriksson in the 1920s, a history of AAC blocks started. It was his aim to develop a building material that was both durable and light. He experimented and found an approach to making the AAC block, a cellular concrete product, by mixing sand/fly ash, lime, cement, and aluminium powder. The building sector was completely transformed by this invention, which provided excellent insulation, fire protection, and ease of use.

Autoclaved Aerated Concrete, or AAC, blocks are an innovative and lightweight building material that is revolutionising the construction industry. These blocks are unique because of their specific blend of sand/fly ash, lime, cement, and aluminium powder. They're easy to handle and transport as they're very light for their size. Despite their weight, AAC blocks provide good insulation that keeps the residence warm in the winter and cool in the summer. Moreover, they are simple to work with and fire-resistant, giving builders additional flexibility. AAC blocks provide an adaptive solution for modern building codes, ranging from strong, load-bearing walls to non-load-bearing partitions

NXTBLOC AAC Blocks

Big Bloc Construction Limited, an Indian Corporation with its Headquarters in Surat, Gujarat, India is a leading manufacturer and supplier of AAC Blocks Marketed under the Brand Name of NXTBLOC. Two types of autoclaved aerated concrete are Manufactured under NXTBLOC distinguished: autoclaved sand-based aerated concrete and autoclaved fly ash aerated concrete.

NXTBLOC®

AUTOCLAVED AERATED CONCRETE BLOCKS

3 X Lighter Construction then brick	Weight third of a clay brick structure, results in a 20% reduction in steel utilisation and cost savings
4 X Faster Construction	25% Reduction in air conditioner load and 25 -30% less electricity consumption on HVAC

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SAND-BASED AAC BLOCKS


FLY ASH AAC BLOCKS

Properties	Sand Base AAC Blocks	Fly Ash AAC Blocks
Definition	Sand Based AAC Blocks is a lightweight porous product made of silica material (sand or quartz tailings) and calcium material (lime, cement), mixed with an aerating agent (aluminium powder), through the process of batching, mixing, pouring, pre-curing, cutting, autoclaving and maintenance.	Fly Ash AAC Blocks is a new type of wall material made of fly ash, lime, cement, conditioning agent, and aerating materials, through the process of batching, mixing, pouring, static stopping, cutting, and autoclaved maintenance. Its production process is basically the same as that of sand aerated.
Composition	62% Sand – 16% Cement – 20% lime – 02% Gypsum – 0.1% Aeration Agent	65% Fly Ash – 23% Cement – 11.1% lime – 1.1% Gypsum – 0.1% Aeration Agent

Features of AAC Blocks

Features	Sand Base AAC Blocks	Fly Ash AAC Blocks
Colour	Mostly off-white, or white with a little yellow	Mostly grey, or brown with a touch of green
Raw Material	Grinded sand is the primary raw material.	Fly Ash is the primary raw material.
Accuracy	Dimensional accuracy is marginally higher and the look is flatter overall.	Exhibits great dimensional correctness and a flat look.
Thermal Insulation (under the same compressive strength)	Performs better in terms of thermal insulation and has a more comprehensive and consistent pore structure than grey aerated	Fly Ash that has been aerated has a comprehensive, homogeneous pore structure that performs well as thermal insulation.
Dry Shrinkage	Sand base blocks are denser than fly Ash blocks. It results in Lower drying shrinkage.	Fly ash blocks are typically less dense than sandblocks. Lower density often translates to greater shrinkage.
Energy Consumption	Sand extraction, processing, and transportation require significant energy.	Utilizing fly ash, a waste product from coal power plants can potentially reduce the overall embodied energy compared to using virgin sand.

Technical Parameters

Parameter	Sand Base AAC Blocks	Fly Ash AAC Blocks
Main Material	Quartz Sand	Fly Ash (by-product of coal combustion)
Density	550 - 650 kg/m^3	550 - 650 kg/m^3
Compressive Strength	3.5 – 5.0 N/mm^2	3.5 – 5.0 N/mm^2
Fire Resistance	Up to 4 hours (depending on thickness)	Up to 4 hours (depending on thickness)
Thermal Conductivity	0.13 W/m2.K	0.16 W/m2.K
Sound Insulation	43-46 dB (200 mm thickness wall)	45-48 dB (200 mm thickness wall)
Moisture Resistance	Moderate	High
Drying Shrinkage	0.03% to 0.05%	0.04% to 0.06%
Environmental Impact	Uses natural resources (sand)	Recycles industrial waste (fly ash)

How AAC Blocks Are Made?

NXTBLOC AAC Blocks are made using a captivating procedure that combines a chemical reaction with natural resources.

1. Raw Material Preparation:

- Sand or Fly Ash: The primary aggregate, depending on the AAC block type. Sand-based blocks offer higher strength, while fly ash blocks are eco-friendly.
- Lime and Portland Cement: Binding agents that provide structure and strength to the final block.
- Gypsum: Acts as a setting retarder, controlling the hardening process.
- Water: Essential for mixing and chemical reactions.
- Aluminium Powder: The key player in creating the lightweight property of AAC blocks.

2. Mixing and Slurry Formation:

- After each component is carefully weighed, it is added to a large mixer. After adding the water, the mixture is well mixed to create a uniform slurry.

3. The Aeration Process & Hardening:

- This is where the magic happens! The highly alkaline atmosphere that the cement and lime create interacts with the aluminium powder. Hydrogen gas is released during this process and settles in the slurry as tiny air bubbles. The mixture foams and expands as a result of these air bubbles, substantially increasing its volume.
- The mixture solidifies and gains some initial strength in the filled moulds throughout the setting phase.

4. Cutting and Sizing:

- The blocks are taken out of the moulds and Cut with a wire saw in the required sizes
- The surface of the cut blocks is then completed using a grinding machine and the blocks get ready

5. Autoclaving:

- The moulded blocks are taken to an autoclave, which is a large pressure vessel after they've been set.
- For several hours, the blocks are exposed to saturated steam at a temperature of 180–200°C and high pressure (around 8–12 atmospheres) within the autoclave. This procedure: Promotes additional hardness and strength growth by curing the AAC blocks and expanding the trapped air bubbles even more, creating the block's cellular structure.

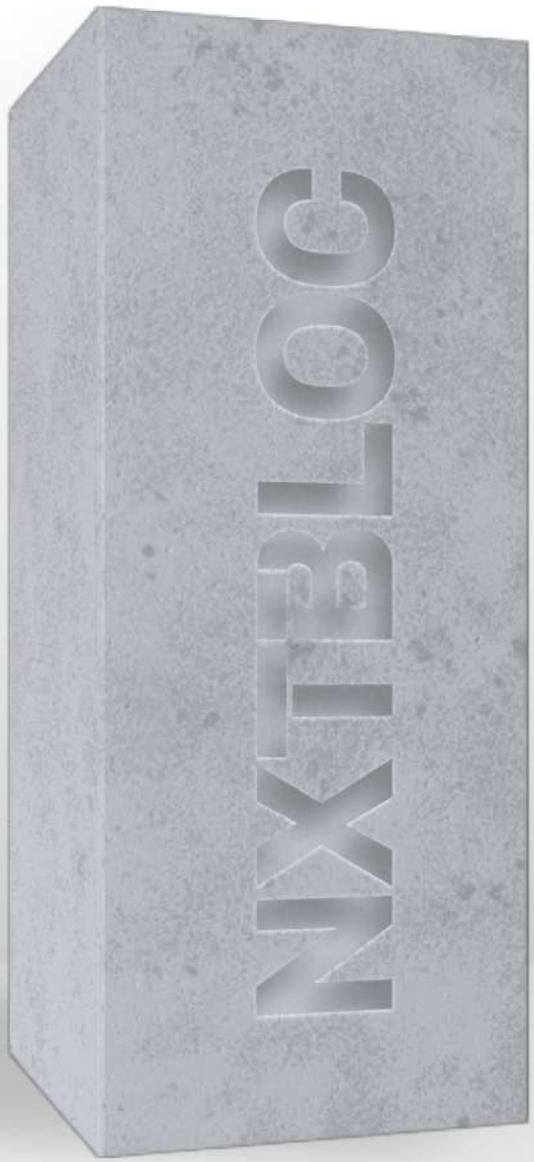
6. Packaging & Loading:

- Then the AAC Blocks are examined, packaged, and gets Loaded in the Vehicle for delivery to building sites.

Comparison AAC Blocks Vs Bricks

Sr. No.	Parameters	AAC Block	Red Bricks
1	Size	600 x 200 x (50-300), 625 x 240 x (50-300) 650 x 240 x (50-300)	225 mm x 100 mm x 65 mm 230 mm x 75 mm x 115 mm
2	Precision in Size (Variation)	1.5 mm (+/-)	5 to 10 mm (+/-)
3	Compressive Strength	3.5-4 N/mm2 (Mpa)	1.5-2.0 N/mm2 (Mpa)
4	Density Range	550-650 kg/m3 (oven dry)	1800-2000 kg/ m3
5	Fire Resistance (6" Wall)	3.5-4 Hrs	2 Hrs
6	Energy Saving	High (~25 reduction in AC Cost & 25-30% less Electricity Consumption on HVAC)	Low
7	Thermal Conductivity (K Value)	0.16 W/m2.k	0.81 W/m2.k
8	Sound Transmission Rating	40-43db for 100mm wall	More than 32db for 100 thick wall
9	Speed of construction & Labour Output	4x Faster Construction	Comparatively lower
10	Moisture Resistance	High	Low
11	Water Absorption Coefficient in Kg/ m2 x h0.5	4–6 (no continuous pores and capillaries)	2 –30 (suction through continuous capillary action)
12	Earthquake Resistant	High	Low
13	Wastage Due to Breakages	Minimal (1-5%)	Approximate 10 to 15%
14	Pest & Termite Resistance	High	Low
15	Fume Resistance	High	Average
16	Drying Shrinkage	0.04%	0.80%
17	Thickness of Mortars	3-4 mm thickness layer	10-12 mm thickness layer
18	Structural cost	Steel saving up to 15% & Concrete saving up to 7%.	Zero saving Benefit

Advantages of AAC Blocks



Light Weight

AAC blocks are considerably more lightweight than conventional concrete blocks, yet they preserve outstanding strength.

High Strength & Longevity

These are various grades of AAC blocks with different compressive strengths. Depending on the engineering design, higher-grade blocks can support heavy loads, which qualifies them for structural uses such as load-bearing walls, columns, and beams.

Earthquake Resistant

Lightweight blocks show exceptional resistance to earthquake forces since the forces exerted by an earthquake on a structure are directly proportional to the building's weight. It has been demonstrated to ensure category 5 tropical cyclone wind loads.

Water Resistant

The lightweight block's microscopic structure prevents capillary action, making it indestructible to water. Additives based on silicone improve its water barrier properties considerably.

Thermal Insulation

AAC Blocks are excellent insulators, keeping interiors cool in summer and warm in winter, reducing energy costs.

Energy Efficient

Because of its high thermal insulation, it reduces air conditioner load by 25% and saves 25-30% on HVAC electricity use.

Soundproofing Properties

With exceptional soundproofing capabilities, AAC Blocks create serene indoor environments by minimizing external noise.

Fire Resistance

Engineered to withstand high temperatures, AAC Blocks provide superior fire resistance, ensuring enhanced safety. Its distinct cellular structure offers a superior fire rating. Because of their cellular structure, AAC fly ash blocks withstand fire without breaking down. With a 4-hour fire rating, it is the best in its class. The melting point of AAC Blocks is over 1600 degrees Celsius.

Cost Saving

AAC blocks are nine times larger than red clay bricks, reducing the need for mortar joints by almost 66%. Weighing one-third of a clay brick structure results in a 20% reduction in steel usage and cost savings.

Pest Resistance

AAC's pest-resistant blocks composed of inorganic materials prevent termites from causing damage and losses.

Sizes Offered

NXTBLOC AAC Blocks

Sr No	Dimension	CBM of AAC	No of Blocks in 1 CBM
1	600 x 200 x 50	0.006	166.67
2	600 x 200 x 75	0.009	111.11
3	600 x 200 x 100	0.012	83.33
4	600 x 200 x 125	0.015	66.67
5	600 x 200 x 150	0.018	55.56
6	600 x 200 x 175	0.021	47.62
7	600 x 200 x 200	0.024	41.67
8	600 x 200 x 225	0.027	37.04
9	600 x 200 x 250	0,03	33.33
10	600 x 200 x 275	0.033	30.3
11	600 x 200 x 300	0.036	27.78
12	625x240x50	0.0075	133.33
13	625x240x75	0.01125	88.89
14	625 x 240 x 100	0.015	66.67
15	625x240x125	0.01875	53.33
16	625 x 240 x 150	0.0225	44.44
17	625x240x175	0.02625	38.1
18	625x240x200	0.03	33.33
19	625x240x225	0.03375	29.63
20	625x240x250	0.0375	26.67
21	625x240x275	0.04125	24.24
22	625 x 240 x 300	0.045	22.22
23	650 x 240 x 50	0.0078	128.21
24	650 x 240 x 75	0.0117	85.47
25	650 x 240 x 100	0.0156	64.1
26	650 x 240 x 125	0.0195	51.28
27	650 x 240 x 150	0.0234	42.74
28	650 x 240 x 175	0.0273	36.63
29	650 x 240 x 200	0.0312	32.05
30	650 x 240 x 225	0.0351	28.49
31	650 x 240 x 250	0.039	25.64
32	650 x 240 x 275	0.0429	23.31
33	650 x 240 x 300	0.0468	21.37

Application Guidelines

PREPARATION

- **Foundation**

  Ensure that the foundation is level, stable, and constructed in accordance with the structural design. Concrete footings or reinforced masonry bond beams are commonly used for support.

- **Mortar Mixing**

  Prepare a thin-bed mortar mix according to the manufacturer's instructions. A standard mix for AAC blocks consists of cement, sand, and water in a 1:6:1 ratio. Always adhere to the precise guidelines supplied for your chosen mortar.

- **Tools and Materials**

  Gather the appropriate instruments, including a level, rubber mallet, trowel, drill, mixing bucket & safety equipment (gloves, goggles, dust mask). Keep adequate AAC blocks, mortar mix, and cutting tools (a carbide saw with a diamond blade) on hand.

BLOCK LAYING

- **First Course**

  Using a trowel, apply a thin layer of mortar (around 3-5 mm) on the foundation. Using an optical level, carefully set the first corner AAC block to ensure it is level and plumb (precisely vertical). Repeat the process with the other corner block.

- **Subsequent Courses**

  Using a trowel, apply a thin coating of mortar to the top of the previous course and the block's vertical end. Ensure appropriate joining of the blocks by using a stepped layout. Tap the block carefully with a rubber mallet to ensure a tight fit.

- **Cutting Blocks**

  If necessary, use a carbide saw with a diamond blade to cut AAC blocks to the required size. When cutting, wear suitable safety gear.

- **Levelling and Checking**

  As you develop, use a spirit level to check the wall's level and plumb. Any irregularities should be corrected quickly.

- **Door and Window Apertures**

  Leave designated apertures for doors and windows as per the building plan. Install support structures, such as lintels, above these openings to handle the load.

FINISHING TOUCHES

- **Curing Time**

  Allow the mortar to cure according to the instructions provided by the manufacturer. This normally takes 24-48 hours, depending on the weather.

- **Joint Filling**

  Once dried, use Block Joining Mortar for AAC blocks to repair any gaps or uneven mortar joints.

- **Surface Finishing**

  The surface of AAC blocks can be left exposed for an industrial appearance or treated with plaster, paint, or other exterior cladding materials based on your design needs.

Standards for AAC Blocks

Indian Standards

- **IS 2185 (Part 3): 1984 (Reaffirmed 2005)**

  This code specifies the requirements for Autoclaved Cellular Aerated Concrete (AAC) Blocks, including material composition, dimensions, density, strength, and other properties. It essentially sets the benchmark for the quality of AAC blocks used in India.

- **IS 6041: 1985 (Reaffirmed 2005)**

  This code provides guidelines for the proper construction practices using AAC blocks. It covers aspects like mortar selection, block laying techniques, curing procedures, and recommendations for achieving proper wall performance.

- **IS 6441 (Series): 1972 (Reaffirmed 2001)**

  This is a series of codes dealing with Stone Masonry. It likely covers aspects like types of stones, selection criteria, dressing and preparation of stones, construction methods for stone masonry walls, and mortar specifications for stone masonry (depending on the specific part - Part 1, 2, or 5).

- **IS 3346: 1980 (Reaffirmed 2005)**

  This code specifies requirements for methods of testing for masonry units. It likely details testing procedures for various properties of masonry units, including compressive strength, water absorption, and dimensional tolerances. This standard would be helpful for manufacturers to ensure their AAC blocks comply with IS 2185 (Part 3).

International standards

- **United States (US)**

  ASTM C1452 - Standard Specification for Autoclaved Lightweight Concrete Blocks

  This standard, set by the American Society for Testing and Materials (ASTM), outlines the requirements for AAC blocks in the US. It covers aspects like Material composition, Classification based on density, Dimensions and tolerances, Physical properties (density, compressive strength, water absorption, thermal conductivity), and Quality control procedures.

- **Europe**

  EN 771-1:2003 - Specification for masonry units. Part 1: Clay masonry units (excluding lightweight aggregate clay blocks)

  This European Standard applies to factory-made lightweight aggregate concrete masonry units, including AAC blocks. It addresses, Classification, Dimensions and tolerances. Material properties, Conformity assessment procedures

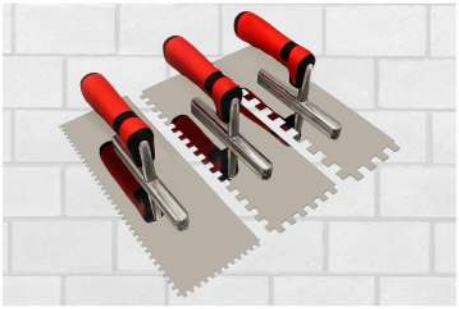
- **Japan**

  JIS A 5416:2014 - Autoclaved Lightweight Concrete Blocks

  This Japanese Industrial Standard specifies requirements for autoclaved lightweight concrete blocks, including AAC blocks. It focuses on Material composition, Dimensions, Physical and mechanical properties (density, strength, thermal conductivity), and Quality control.

NOTE: • These are only a few examples; other countries or regions may have their own AAC block standards. • Always refer to the most recent version of the standard for the most up-to-date specifications. • Standards often focus on the qualities of AAC blocks rather than the AAC material itself.

Important Masonry Tools for Construction Using AAC Blocks



Notched Trowel

A trowel with notches on the edge helps spread mortar evenly and create the ideal bed for the AAC blocks.

Rubber Mallet Hammer

Used to gently tap and position AAC blocks into place without damaging them.

Spirit Level Scale Meter

Ensures the walls are perfectly vertical (plumb) during construction.

Measuring Tape

Measures distances and ensures accurate block placement.

Angle Grinder (with Diamond Blade)

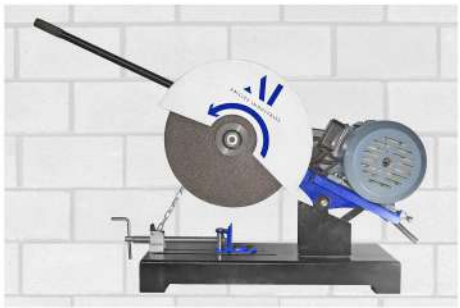
Used for cutting AAC blocks to size precisely. Safety glasses and a dust mask are essential when using this tool.

Carbide Saw (Handheld)

An alternative to the angle grinder for smaller cutting jobs. Safety glasses and a dust mask are essential when using this tool.

Grout Float

Used to smooth and finish mortar joints after the blocks are laid.



Motorised Cutting Machine

AAC Blocks Cutting for Speedy and accurate cutting

Band Saw Machine

AAC Blocks Cutting for a big project

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