



Delivering World-class Lightweight Solutions

# Starken®

Autoclaved Aerated Concrete

*Product Guide*





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## Delivering Quality Sustainable Building Solutions

**Starken AAC Sdn Bhd is the leading AAC (Autoclaved Aerated Concrete) manufacturer in Malaysia** that aims to deliver quality products to its customers. With its commitment to quality products & services, Starken invested in the state-of-the-art machineries and technology supplied by Wehrhahn of Germany.

Situated at Serendah, Selangor. Starken's production facility manufactures blocks efficiently and engineered panels cost-effectively with an annual capacity of 600,000 cubic meters. It covers a wide range of AAC products with various compressive strengths to cater for specific architectural and design requirements of various types of buildings. Starken's main products include AAC blocks, panels and lintels with density of 450 kg/m<sup>3</sup> – 700 kg/m<sup>3</sup>.

With its storage capacity of more than 10,000 m<sup>2</sup>, the supply of AAC products will always be sufficient to meet the demand of on-going projects.

## Commitment to Excellence

Starken prides itself on maintaining the highest level of customer service and support. Every member of Starken is committed to both excellence in customer service and the production of quality building materials.

At Starken, we listen very carefully to our customers' needs and concerns. We ensure that our customers receive better value and excellent product performance through our expertise, knowledge and experience in assisting them in all areas of their construction related needs on AAC products.



# ADVANTAGES OF AUTOC LAVED AERATED CONCRETE

## Sound Resistant

Scientifically proven to provide better insulation to sound transmitted by air compared with other solid building materials.



## Durable

History of usage dated more than 50 years protecting building envelopes and remain durable even under extreme weather conditions.



## Dimensional Accuracy

Blocks and panels are manufactured under factory environment using state-of-the art modern machineries resulting in products with tighter dimensional tolerances.



## Fire Resistant

More superior than traditional masonry for products with fire resistant up to 4 hours for a nominal block thickness of 100 mm.



## Cost-effective

Speed and ease of installation result in cost savings compared to traditional masonry construction.



## Impact Resistant

Wall erected using 100 mm thick AAC products is classified as "Severe Duty" grade and able to withstand impact loads potentially resulting from rough usage.



## Good Workability

Starken AAC can be easily sawn, cut, carved, nailed or drilled using ordinary hand tools.



## Thermal Comfort & Energy Saving

Starken AAC's excellent thermal insulation properties result in improved comfort level and saves heating and cooling costs.



## Lightweight

Starken AAC density is about one-fifth of that of normal concrete blocks, making it easily handled.



## Water Resistant

Starken AAC contains millions of closed microscopic cells which strongly resist moisture from passing through.



## Eco-friendly

Starken AAC to help reduce at least 30% of environmental waste, decrease 50% of greenhouse radiation and over 60% integrated energy on the surface of brick.



AAC products are made using slurry mix containing cement, sand, lime and aerating agent. The slurry is poured and moulded to form lightweight blocks, panels and lintels upon which are cured in autoclave. The high-pressure steam-curing mechanism in the autoclave facilitates the curing process of the moulded lightweight concrete, producing physically and chemically stable products that weigh about 1/5 of normal concrete. AAC products contain millions of tiny non-connecting air pockets yielding superior thermal insulation property. AAC products are typically installed to form walls, floors and roofs.

AAC products are becoming the preferred building products for constructing residential, hotel, industrial and public buildings because of its natural composition and non-toxic property, saves energy and environmental friendly. AAC products possess the durability characteristics similar to normal concrete or stone, yet with workability better than wood.

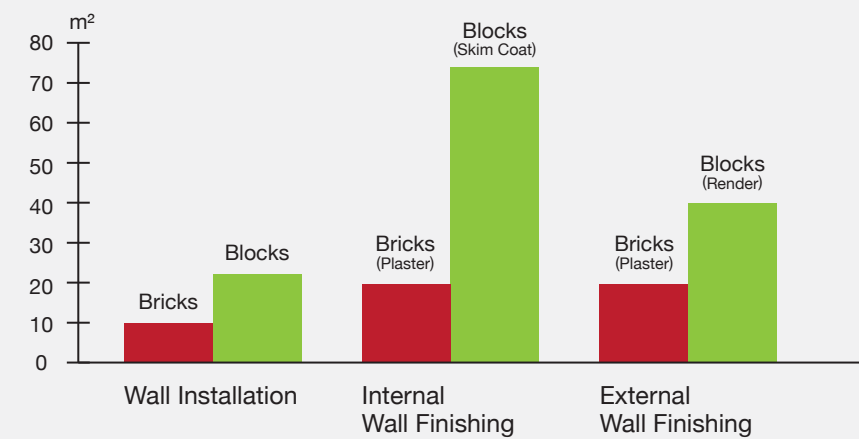


# Cost-saving Benefits

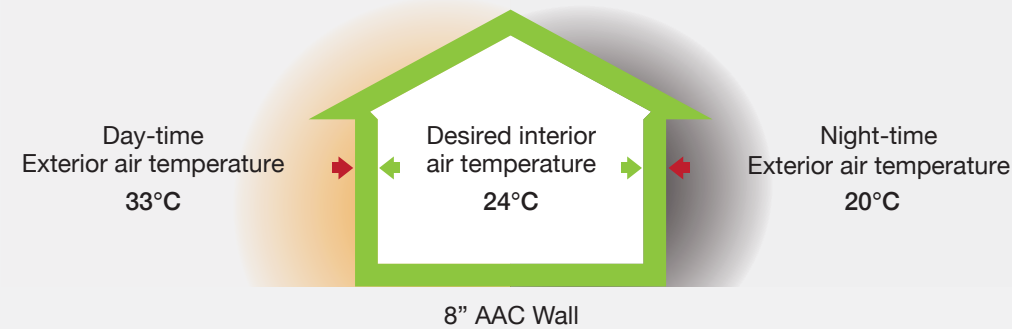
## 1 Save up to 25% of Foundation Cost Brick vs AAC Block



## 2 Wall Installation Speed AAC Block vs Brick (m<sup>2</sup>/ worker/ day)

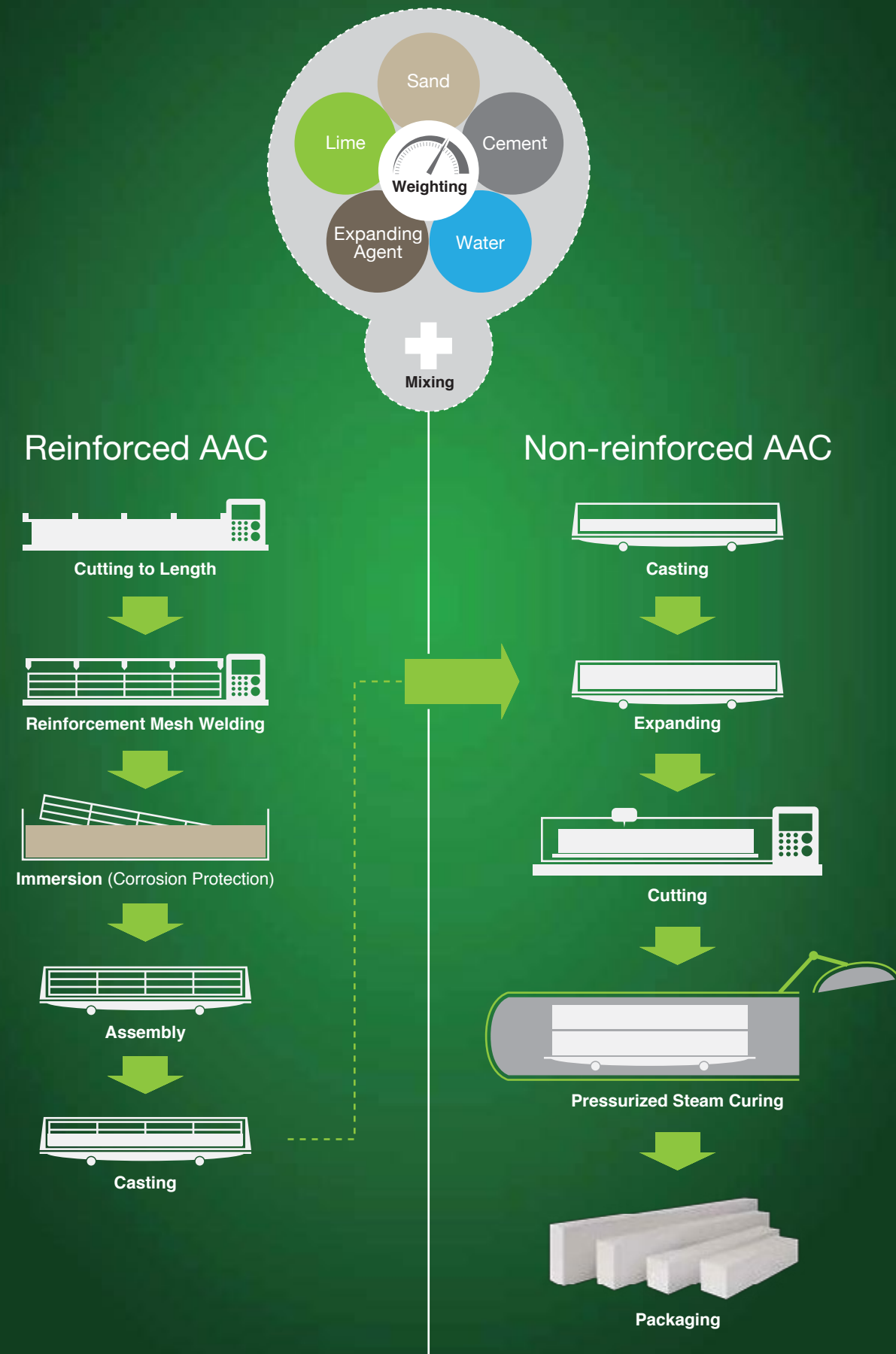


## 3 Thermal Control Heat insulation 6 times superior than clay brick



Note : Building uses approximately 30% less energy for cooling and heating the interior air space.

# Production Process





AAC Building Systems

# WHERE TO APPLY STARKEN PRODUCTS?

Autoclaved Aerated Concrete is ideal for load-bearing and non-load bearing applications. In addition, Starken AAC products are suitable for various types of buildings such as:

- Residential Units
- Commercial Units
- Hospitals
- Factories
- Schools / Universities
- Hotels
- Shopping Malls
- Public Transport Intersection Buildings





# SUSTAINABILITY

Starken AAC is a sustainable material and contained up to 20% of recycled materials. It provides long life span and is also recyclable, making it an exceptionally green building material.

## Design

Starken AAC products are manufactured in standard sizes for ease of installation and compliance to Industrialised Building System (IBS) requirement.

## Manufacturing & Delivery

Starken AAC production incorporates recycled material and employs strict waste minimization scheme while the transport fleets use less fuel (energy) to deliver goods to job sites.

## Construction

Starken AAC products have better dimensional tolerances, can be cut easily and accurately. Consequently, superior finishing on completed walls meeting CIDB's QLASSIC requirement can be achieved. Available in sizes larger than conventional bricks/ blocks, Starken AAC products can be erected up to 3 times faster than brick wall.

## Use

Starken AAC products are not only lightweight technology but also provide high-performance features such as thermal comfort, energy saving, high-impact, water & fire resistance.

## End of Life

Starken AAC blocks are fully applicable for recycling to create new construction materials. Building made of AAC can be altered easily according to specifications to avoid the hassle of demolishing & rebuilding.



# STARKEN® BLOCKS

Starken offers a wide range of cost effective AAC block solutions for various types of wall applications. They are typically used in the construction of internal and external walls as well as in the construction of fire-rated walls such as party, compartment and separating walls.

## Product Summary

Product	Length x Height (mm)	Thickness (mm)	General Usage
Standard Block • CoolPro3™ • DuraPro5™ • StrongPro7™ <small>NEW</small>	600 x 200	50, 75, 100, 125, 150, 175, 200, 225, 250, 300	All blocks are applicable for infill walls.  Only block thickness 125mm & above are suitable for use as load-bearing walls.
Jumbo Block & Jumbo Block EZ • CoolPro3™ • DuraPro5™	600 x 400, 600 x 600, 600 x 1200	100, 125, 150, 200  * Jumbo Block EZ only available in thickness 150 & 200mm	All blocks are applicable for infill walls & load-bearing walls.
Interlocking Block • CoolPro3™ • DuraPro5™	600 x 200	150, 200	All blocks are applicable for infill walls & load-bearing walls.

## Standard Block

### Applications:

- General internal & external walls
- Party, compartment & separating walls
- Acoustic & fire-rated walls

### Working dimension: Length x Height (mm)

Blocks are available in 600 x 200

### CoolPro3™

Compressive Strength: **3.5 MPa**  
Thermal Conductivity: **0.172 W/m.K**  
Nominal Dry Density: **500 ± 50 kg/m³**  
Working Density: **700 ± 50 kg/m³**

### DuraPro5™

Compressive Strength: **5.5 MPa**  
Thermal Conductivity: **0.244 W/m.K**  
Nominal Dry Density: **600 ± 50 kg/m³**  
Working Density: **840 ± 50 kg/m³**

### StrongPro7™

Compressive Strength: **7.0 MPa**  
Nominal Dry Density: **650 ± 50 kg/m³**  
Working Density: **910 ± 50 kg/m³**

### Properties:

Modulus of Elasticity  
**1,500 - 2,500 MPa**  
  
Ultimate Tensile Strength  
**0.44 - 0.55 MPa**  
  
Modulus of Rupture  
**0.44 - 0.55 MPa**



Starken Standard Blocks offer a fast, convenient and versatile solution for most walling requirements. Each block is equivalent to 7 pieces of common brick.

Starken AAC blocks are easy to work with and can be cut to size with a tungsten carbide-tipped handsaw. This allows maximum flexibility and minimizes wastage.

### Packaging

Length x Height (mm)	Thickness (mm)	Quantity per pallet	Coverage per pallet	
			m²	m³
600 x 200	50	360	43.2	2.2
	75	240	28.8	2.2
	100	180	21.6	2.2
	125	144	17.3	2.2
	150	120	14.4	2.2
	175	96	11.5	2
	200	84	10.1	2
	225	72	8.6	1.9
	250	72	8.6	2.2
	300	60	7.2	2.2
Length x Height (mm)	Thickness (mm)	Weights (kg)		
		CoolPro3™	DuraPro5™	StrongPro7™
600 x 200	50	4	5	5.5
	75	6	7.5	8.2
	100	8	10	10.9
	125	10	12.5	13.7
	150	12	15	16.4
	175	14	17.5	19.1
	200	16	20	21.8
	225	17.8	22.5	24.6
	250	20	25	27.3
	300	24	30	32.8

Note :  
1. The above information may subject to change.  
2. Do not use the above information for calculating the transportation weight and volume.

# Jumbo Block

# Jumbo Block EZ

Applications:

- General internal & external walls
- Party, compartment & separating walls
- Acoustic & fire-rated walls

Working dimension:  
Length x Height (mm)

Blocks are available in  
600 x 400, 600 x 600, 600 x 1200



Starken Jumbo Blocks are specifically manufactured up to 6 times larger than standard blocks. Construction output will significantly improve due to the block size, coupled with ease of assembly as blocks can easily be aligned. Jumbo Block EZ is equipped with hand-hold notch at both ends to facilitate handling.

Packaging

Length x Height (mm)	Thickness (mm)	Quantity per pallet	Coverage per pallet		Weights (kg)	
			m <sup>2</sup>	m <sup>3</sup>	CoolPro3™	DuraPro5™
600 x 400	100	90	21.6	2.2	15.8	20
	125	72	17.3	2.2	19.8	25
	150	80	19.2	2.9	23.8	30
	200	42	10.1	2	31.7	40
600 x 600	100	60	21.6	2.2	23.8	30
	125	48	17.3	2.2	29.7	37.5
	150	40	14.4	2.2	35.6	45
	200	28	10.1	2	47.5	60
600 x 1200	75	40	28.8	2.2	37.8	45.4
	100	30	21.6	2.2	50.4	60.5

Note :  
1. The above information may subject to change.  
2. Do not use the above information for calculating the transportation weight and volume.

CoolPro3™

Compressive Strength: **3.5 MPa**  
Thermal Conductivity: **0.172 W/m.K**  
Nominal Dry Density: **500 ± 50 kg/m³**  
Working Density: **700 ± 50 kg/m³**

DuraPro5™

Compressive Strength: **5.5 MPa**  
Thermal Conductivity: **0.244 W/m.K**  
Nominal Dry Density: **600 ± 50 kg/m³**  
Working Density: **840 ± 50 kg/m³**

Properties:

Modulus of Elasticity  
**1,500 - 2,500 MPa**  
  
Ultimate Tensile Strength  
**0.44 - 0.55 MPa**  
  
Modulus of Rupture  
**0.45 - 0.55 MPa**

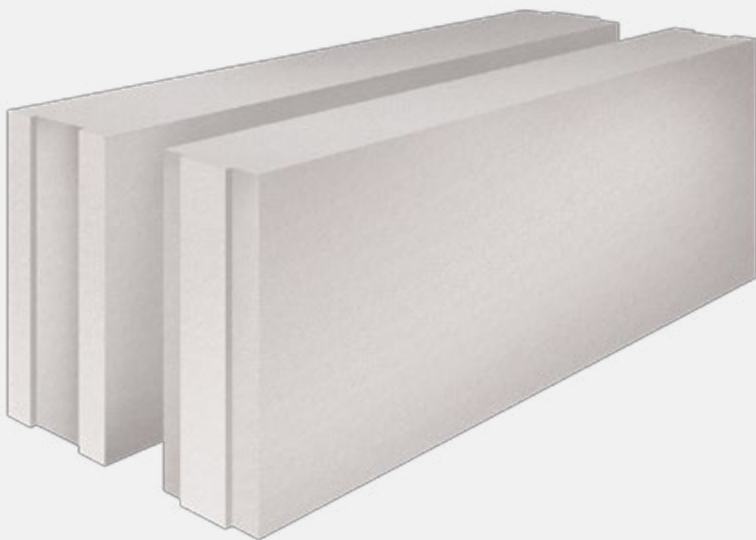
# Interlocking Block

Applications:

- General internal & external walls
- Party, compartment & separating walls
- Acoustic & fire-rated walls

Working dimension:  
Length x Height (mm)

Blocks are available in  
600 x 200



Construction gets easier and neater with the introduction of Starken Interlocking Blocks. Block edges are profiled with tongue and groove interlocking joint system that does not only make wall construction much easier but also produce a more stable wall.

Packaging

Length x Height (mm)	Thickness (mm)	Quantity per pallet	Coverage per pallet		Weights (kg)	
			m <sup>2</sup>	m <sup>3</sup>	CoolPro3™	DuraPro5™
600 x 200	150	120	14.4	2.2	12	15
	200	84	10.1	2	16	20

Note :  
1. The above information may subject to change.  
2. Do not use the above information for calculating the transportation weight and volume.

CoolPro3™

Compressive Strength: **3.5 MPa**  
Thermal Conductivity: **0.172 W/m.K**  
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DuraPro5™

Compressive Strength: **5.5 MPa**  
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Properties:

Modulus of Elasticity  
**1,500 - 2,500 MPa**  
  
Ultimate Tensile Strength  
**0.44 - 0.55 MPa**  
  
Modulus of Rupture  
**0.45 - 0.55 MPa**



# STARKEN® PANELS

Building with Starken Panels is simple, efficient and cost effective. Starken’s wide range of panel sizes bring every construction smart saving of time and money.

Starken Panels also contributes to the building’s safety as fire protection wall and floor. Fire test according to current standards have proven that Starken Panels can withstand a fire up to 6 hours.

Not only that, each panel is also reinforced with corrosion-protected, fully welded steel cage. Starken Panels are available up to 6m in length.

## Wall Panel Summary

Product	Length (mm)	Height (mm)	Thickness (mm)	General Usage
<ul style="list-style-type: none"> <li>Wall Panel</li> </ul> 	600 - 6000	600  * 300mm, 400mm and 500 mm available upon request.	75, 100, 125, 150, 175, 200.	All wall panels are applicable for infill walls & load-bearing walls.

## Floor Panel Summary

Product	Length (mm)	Width (mm)	Thickness (mm)
<ul style="list-style-type: none"> <li>Floor Panel</li> </ul> 	600 - 6000	600  * 300mm, 400mm and 500 mm available upon request.	100, 125, 150, 175, 200.

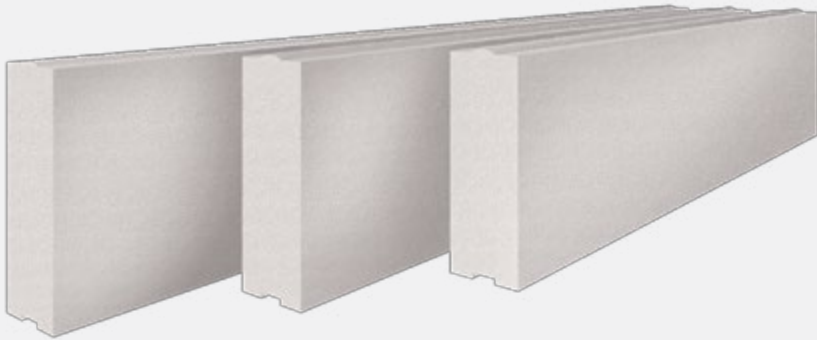
## Wall Panel

### Applications:

- Wall panels for residential & non-residential buildings

### Working dimension:

Wall panels are available from 600 - 6000mm length with the height at 300 - 600mm. Thickness from 75 - 200mm.



Starken Reinforced Wall Panels are available in various edge profiles such as standard square, chamfered, tongue and groove or a combination of any of these edge profiles. Panel installation incorporates special brackets secured to structural members such as beams/ columns/ slabs to provide wall lateral stability.

Wall panels are typically used in non-residential buildings such as hospitals, universities, schools, factories, warehouses, shopping malls, e.t.c.

Panels can be installed onto buildings of reinforced concrete or steel structure.

Compressive Strength:  
**3.5 MPa**

Thermal Conductivity:  
**0.172 W/m.K**

Density  
**Dry 550 kg/m³**  
**Working 780 - 820 kg/m³**

### Properties:

Modulus of Elasticity  
**2,190 MPa**



# Floor Panel

**Applications:**

- Floor panels for residential & non-residential buildings

**Working dimension:**  
Length x Height (mm)

Floor panels are available from 600 - 6000mm length with the width at 600mm. Thickness from 100 - 200mm.



Starken Floor Panels are rebated at the long edges. These rebates form a channel for the purpose of bonding one panel to another, providing virtually seamless floor base ready for rendering.

Available in standard thickness of 100mm to 200mm, Starken Floor Panels are designed to cater for loadings of various floor uses as described in UBBL Malaysia. Typically, floor live load (uniformly distributed load) for residential units is 1.5kN/m². Generally, the load bearing capacity of these panels can be evaluated based on the structure spacing supporting the panels.

Compressive Strength:  
**3.5 MPa**

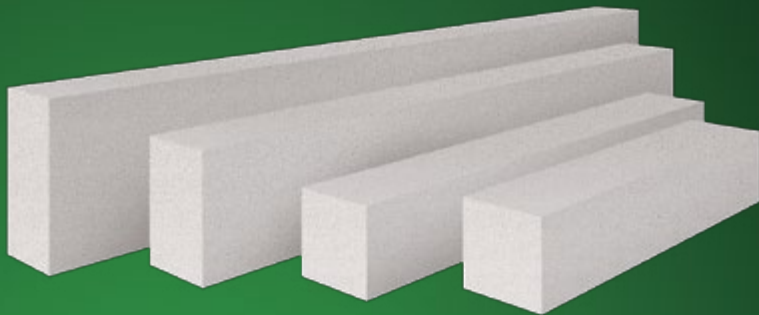
Thermal Conductivity:  
**0.172 W/m.K**

Density  
**Dry 550 kg/m³**  
**Working 780 - 820 kg/m³**

**Properties:**

Modulus of Elasticity  
**2,190 MPa**

# STARKEN® LINTEL



Compressive Strength:  
**3.5 MPa**

Thermal Conductivity:  
**0.172 W/m.K**

Density  
**Dry 550 kg/m³**  
**Working 780 - 820 kg/m³**

**Properties:**

Modulus of Elasticity  
**2,190 MPa**

Starken AAC Lintels are reinforced elements similar to panels. They are used as support over windows, doorways and other openings.

Lintels are available in standard block thickness of 100mm, 125mm, 150mm and 200m and lengths up to 2,700mm.

Refer to lintel table for standard sizes. Please contact Starken AAC Technical Department on information related to allowable working load.

Lintels are also used as spreaders under the end supports of reinforced concrete beams to distribute high bearing stresses into the supporting AAC wall.

## Lintel Summary

Window Opening Width (mm)	Lintel Length (mm)	Lintel Height (mm)	Lintel Thickness (mm)
900	1,200	200	100, 125, 150, 200
1,200	1,600	200	100, 125, 150, 200
1,600	1,900	200	100, 125, 150, 200
1,800	2,200	300	100, 125, 150, 200
2,100	2,700	300	100, 125, 150, 200



# STARKEN® THIN BED ADHESIVE



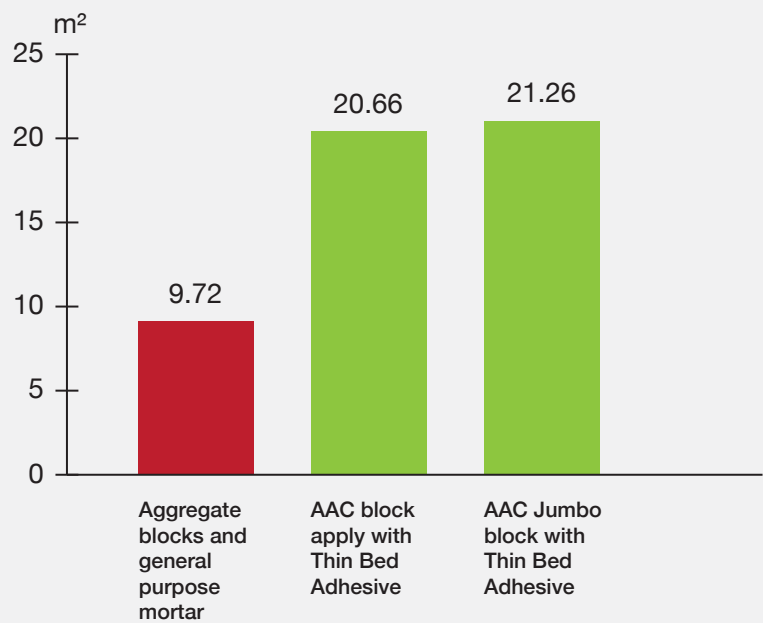
Starken AAC Thin Bed Adhesive is a high-quality cementitious adhesive specially formulated and recommended for bonding Starken AAC products such as blocks, panels and lintels. Backed by extensive testing and historical performance, the use of Starken adhesive ensures optimum performance of the completed assembly, including strength and fire rating.

## Technical Data

Packaging	40kg bag
Colour	Light Grey / Off White
Mixing Ratio	13 - 14 liters of clean water / 40kg bag
Pot Life	1 - 2 hours
Open Time	15 - 30 minutes
Coverage	Approx. 20m <sup>2</sup> / 40kg bag for 100mm blockwork (Estimated based on 2mm thick bedding for 100mm blocks)
Min. Flexural Strength	0.44 MPa
Fire rating	Up to 4 hours when used with Starken AAC Blocks
Fire Hazard	Non-flammable
Toxicity	Nil

## Wall Laying Speed

Thin Bed Adhesive vs General Purpose Mortar (m<sup>2</sup>/ hour)



# STARKEN® RENDER & SKIMCOAT



Starken AAC Render is recommended for external rendering of an external wall, it can also be applied to AAC block wall where a thicker plastering is needed such as wall thickening for tiling purpose.

Starken Skim Coat Base & Skim Coat Finish are applied as a two-coat system and designed for internal wall applications to give a smooth finish.


## Technical data

	Render	Skim Coat Base	Skim Coat Finish
Packaging	40kg bag	40kg bag	25kg bag
Colour	Grey	Grey	Grey
Mixing Ratio	7 - 8 litres water / 40kg bag	11 - 12 litres water / 40kg bag	11 - 12 litres water / 25kg bag
Pot Life	1 hours	2 hours	3 hours
Coat Thickness	10 - 12mm	2 - 4mm	1 - 2mm
Coverage Approx.	1.6kg / m <sup>2</sup> / mm thickness 2.5m <sup>2</sup> / 40kg bag at 10mm thickness	1.4kg / m <sup>2</sup> / mm thickness 10m <sup>2</sup> / 40kg bag at 3mm thickness	1.2kg / m <sup>2</sup> / mm thickness 20m <sup>2</sup> / 25kg bag at 1mm thickness
Binder	OPC / Hydrated lime	OPC	OPC
Max Aggregate Size	Graded sand 2.5mm max	Graded limestone powder / sand 1.0mm	Limestone powder 0.5mm
Additives	Water soluble additives to improve workability, water retention, durability and adhesion.	Water soluble polymers to improve workability, water retention, durability and adhesion.	Water soluble polymers to improve workability, water retention, durability and adhesion.
Fire Hazard	Non-flammable	Non-flammable	Non-flammable
Toxicity	Nil	Nil	Nil


Note : Actual coverage may vary depending on the straightness of the block wall.




# STARKEN® Tools & Accessories

Tools & accessories marked with  are available from Starken AAC Sdn. Bhd.



 150mm  
Notched Trowel




 100mm  
Notched Trowel



Rubber Mallet



 Wall Trencher



Hand Drill



Sanding Float




Standard  
Masonry  
Trowel



Mixing Container



 Tungsten Carbide  
Tipped Saw




 Stirrer




Spirit Level




 ST 2 - Column / Beam Soffit Tie




 ST 8 - Vertical Wall Panel Tie




 ST 1 - Control Joint Tie




 ST 6 - Horizontal  
Wall Panel Tie



 Fiber Mesh  
150mm x 50m

## Anchor Selections

Light Duty	Medium Duty	Heavy Duty
1) Nylon Anchor 8mm x 50mm 	1) Nylon Anchor 10mm x 50mm / 60mm / 100mm  	1) Injection Mortar 
<b>Approx. load</b> up to 10 kg	<b>Approx. load</b> up to 50 kg	<b>Approx. load</b> up to 150 kg
<b>Applications:</b> <ul style="list-style-type: none"> <li>• Coat Hook</li> <li>• Light Fitting</li> <li>• Small Mirror</li> <li>• Painting</li> <li>• on/off Switch</li> <li>• Meter Box</li> </ul>	<b>Applications:</b> <ul style="list-style-type: none"> <li>• LCD/ Plasma TV</li> <li>• Shelf</li> <li>• Satelite Disc</li> <li>• Meter Box</li> <li>• Towel Rail</li> <li>• Curtain Rod/ Rail</li> <li>• Kitchen Cabinets</li> <li>• Window Frame</li> <li>• Air-cond Compressor</li> <li>• Door Frame</li> <li>• Clothes Dryer</li> <li>• Sink/ Urinal/ Basin</li> <li>• Pipe Bracket</li> </ul>	<b>Applications:</b> <ul style="list-style-type: none"> <li>• Heavy DB</li> <li>• Fire Hose Reel</li> <li>• Signboard</li> <li>• Sink/ Urinal/ Basin</li> <li>• Cantilever Support</li> <li>• Awning/ Window Shade</li> </ul>

\*Refer to Starken Technical Department for actual recommended anchor capacity.





Delivering World-class Lightweight Solutions

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