



ASLAN

CONTRACTING & TRANSPORTATION

أصلان للمقاولات والنقليات

ASLAN CONTRACTING & TRANSPORTATION

**ASLAN AAC BLOCK
Technical Data Sheet
& Method of
Statement**



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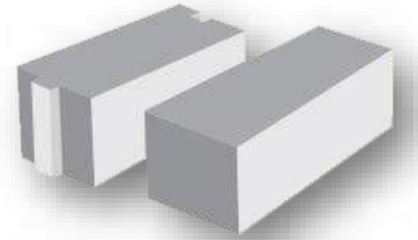
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1.1. ASLAN Block, Technical Data Sheet & Method of Statement.

➤ GENERAL FEATURES.

ASLAN Autoclaved Aerated Concrete (AAC) Solid Block are lightweight, fire resistant, fast and easy install and provides lifelong superior thermal insulation. ASLAN Blocks produce in two different EN771-4 Strength classes G2/05 and G4/06.



➤ USES.

ASLAN Block are used to build reinforced load bearing and non-load bearing exterior and interior walls for residential and multi-family housing, hotels, hospitals, office building, fire and shaft walls, commercial and industrial building. ASLAN AAC meets the diverse demands better than any other material due to the numerous advantages of its physical, mechanical and energy efficiency properties.

➤ BLOCK DIMENSIONS & BLOCKS PALLET DETAILS, G2/05 & G4/06.

AAC Block Class G2/05	Block Dimension (cm)			Pallet Details					Remark
	Thickness	Length	Height	Layers	Columns	No. Of Blocks	Volume (m ³)	Masonry (m ²)	
	10	60	25	18	8	144	2.16	21.6	
	15	60	25	12	8	96	2.16	14.4	Tongue & Groove or Plain
	20	60	25	9	8	72	2.16	10.8	
	25	60	25	7	8	56	2.10	8.4	
	30	60	25	5	8	40	1.80	7.2	

AAC Block Class G4/06	Block Dimension (cm)			Pallet Details					Remark
	Thickness	Length	Height	Layers	Columns	No. Of Blocks	Volume (m ³)	Masonry (m ²)	
	10	60	25	15	8	120	1.80	18	
	15	60	25	10	8	80	1.80	12	Tongue & Groove or Plain
	20	60	25	7	8	56	1.68	8.4	
	25	60	25	6	8	48	1.80	7.2	
	30	60	25	5	8	40	1.80	6	

➤ PROPERTIES.

Characteristic	Strength Class		Units
	G2/05	G4/06	
Dry Density	500	600	Kg/m ³
Thermal Conductivity	0.13	0.16	W/m ² k
Compressive Strength	3.2	5.0	N/mm ²
Fire Rating	4	4	Hrs.



➤ THERMAL INSULATION.

Strength Category	“K” Thermal Conductivity (W/m ² k)	Thickness (mm)	“R” Thermal Resistance (m ² k/W)	“U-value” Overall heat transfer coefficient (W/m ² k)
AAC Block Class G2/05	0.13	100	0.77	1.06
		150	1.15	0.75
		200	1.54	0.58
		250	1.92	0.48
		300	2.30	0.40
AAC Block Class G4/06	0.16	100	0.63	1.25
		150	0.94	0.90
		200	1.25	0.70
		250	1.56	0.58
		300	1.88	0.49

➤ FIRE PERFORMANCE.

BS 476: Part 22:1987

ASLAN AAC Block Size (mm)	Class G2/05		Class G4/06	
	Integrity (minutes)	Insulation (minutes)	Integrity (minutes)	Insulation (minutes)
100	120	120	120	120
150	240	240	240	240
200	240	240	240	240
250	240	240	240	240
300	240	240	240	240
350	240	240	240	240
400	240	240	240	240

➤ ACOUSTIC PERFORMANCE.

STC

Thickness (mm)	Class G2/05		Class G4/06	
	Without plaster	With plaster on both sides	Without plaster	With plaster on both sides
100	37	48	40	49
150	41	48	43-44	50
200	43	49	46	51
250	46	51	48	52
300	48	52	49-52	53-55



➤ Permissible infill area.

- Permissible Area for infill block in External Wall.

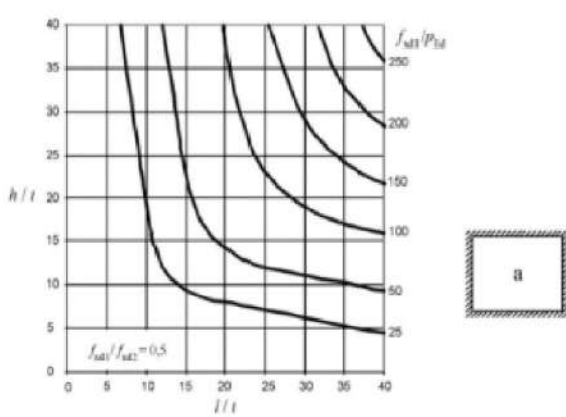


Figure C.2 — Thickness and size limitation of non-bearing walls with lateral loading. Wall type a - $f_{sd1}/f_{sd2} = 0,5$

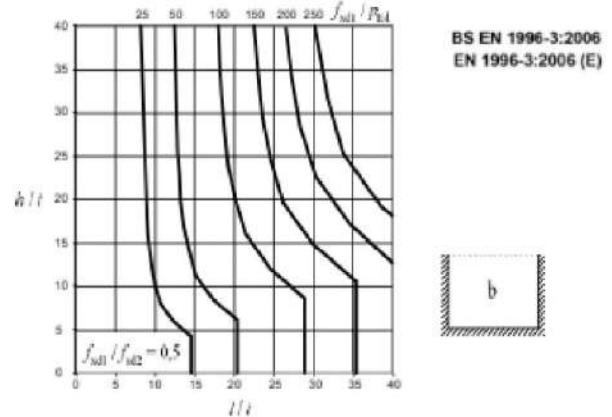


Figure C.5 — Thickness and size limitation of non-bearing walls with lateral loading. Wall type b - $f_{sd1}/f_{sd2} = 0,5$

BS EN 1996-3:2006
EN 1996-3:2006 (E)

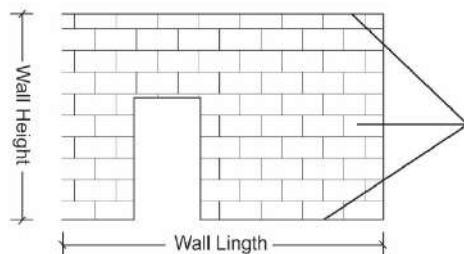
4 fixed edges by figure C.2.

Height h m	Thickness t mm				
	200	250	300	350	400
	Maximum length l [m]				
3	6.40	10	12	14	16
3.5	5.2	8.5	12	14	16
4	4.4	7.5	11.4	14	16
4.5	4	6.25	9.6	14	16
5	3.8	5.5	8.1	11.9	16

3 fixed edges (free edge top) by figure C.5.

Height h m	Thickness t mm				
	200	250	300	350	400
	Maximum length l [m]				
3	3.8	5.25	6.9	8.75	10.4
3.5	3.6	4.75	6.45	8.05	9.6
4	3.4	4.5	6	7.52	9.2
4.5	3.3	4.37	5.7	7	8.8
5	3.2	4.25	5.4	6.65	8.4

- Permissible Area for Non-Bearing Internal walls (Partitions).



Wall is fixed on 3 sides by mortar

Wall Thickness (cm)	Building Use	Wall Height (m)					
		2.50	3.00	3.50	4.00	4.50	<6.00
		Max. Wall-Length* (m)					
10	I	3.50	3.75	4.00	4.25	4.50	No Application
	II	2.50	2.75	3.00	3.25	3.50	
15	I	12.00	12.00	12.00	12.00	12.00	12.00
	II	6.00	6.00	6.00	6.00	8.00	8.00
20	I	12.00	12.00	12.00	12.00	12.00	12.00
	II	6.00	6.00	6.00	6.00	12.00	12.00

Building use I: Less crowd of people like Flat, Hotels, Offices, Hospitals.

Building use II: Large crowd of people like School, Exhibition building, Shop rooms.



➤ **INSTALLATION GUIDE (Method of Statement).**

Before Installation of ASLAN AAC BLOCK.

1. Check Foundation.

Foundation must be designed according to local Building Codes.

Before concrete is poured, check slab dimensions and reinforcement to comply with construction drawings. Ensure the pipes, drains and other penetrations through the slab have been installed properly. ASLAN Block installation will be easier on a level slab.

2. Receiving and Distribution of ASLAN Wall Unit.

Carefully unload the ASLAN pallets using an all-terrain forklift. Rubbing between pallets can cause damage to some pieces. Place pallets around the slab (above ground level) and close to work area.

3. Installation Requirements.

The actual list of tools, equipment and other material will depend on type of project and workforce.

Tools:

- ASLAN Plane block Trowel.
- Rubber hammer (24 Oz min).
- Brick Trowel.
- Masonry level.
- Masonry Scrub Brush.
- Sanding Float.
- Plastic Bucket.
- Spatula.
- Chalk-Line.
- Nylon Construction line.
- Wooden Line Blocks.
- Tape Measure.

Equipment:

- ½” Power Drill.
- Stirrer for Power Drill.
- ASLAN hand Saw.
- Electric Band-Saw (optional).
- Chasing Tools
- Water Level for leveling of block
- 4½” Angle grinder.
- Safety Equipment (Hard hat, Face-shield, goggles, dust mask, ear plugs, gloves, safety shoes, etc.).

Other Materials:

- Metal Strip Connectors.
- Fiberglass Mesh.
- Backer-rod & Caulking.
- Cement-Sand Mortar.
- ASLAN Then Bed Mortar.
- ASLAN Repair Mortar.
- Stucco.
- Rustic Finish.
- Base-coats, Textures, etc.
- Anchors & Nails.



Mixing ASLAN Thin Bed Mortar.

ASLAN Thin Bed Mortar is prepared in a clean container, add two parts of water to five parts of glue (approx. parts) and with a stirrer using a power drill mix to homogeneous creamy paste. Let the mixture rest for about 5 minutes and remix shortly before use. Prepare the quantity for not more than one hour. Do not add any other material. Like sand to the mix.

After through mixing the thin bed–mortar with water, the mortar is ready for use. First dust and loose particles must be brushed form the surfaces. Then apply thin bed-mortar to the horizontal surfaces with a suitable ASLAN plane - block trowel of width equal to block width. While adjusting the mortar consistency, make sure that during application the thin-bed mortar flows easily through the teeth of the plane block trowel over the full surface. The consistency should be such that the mortar strands visible on the horizontal joints after applying mortar by trowel can't mingle. That means the teeth should remain visible.

4. ASLAN Block Installation.

a. Laying the First Course (Leveling Course).

Using a brush, clean block surface before installation. Lay the first course over a semi-dry cement-sand mortar leveling bed (minimum 10 mm thickness, maximum 30 mm thickness). This must be laid correctly for fast building progress in the following courses. In all next courses ASLAN blocks are best laid with ASLAN thin-bed mortar (ASLAN Glue).

b. Cutting Block (Adjustment).

An ASLAN hand saw or a band saw can be used to cut the block to specific lengths (adjustment pieces).

c. Laying the Subsequent Courses.

For subsequent courses, use only ASLAN thin bed Mortar on all joints between ASLAN Block. Use a brush to clean the block surface before mortar application. After block installation, remove spilled mortar using a spatula. Minimum overlapping of vertical joints between layers should be 100 mm.

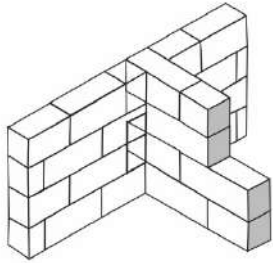
It's recommended to check alignment and level after each unit installation to achieve a plumbed wall.



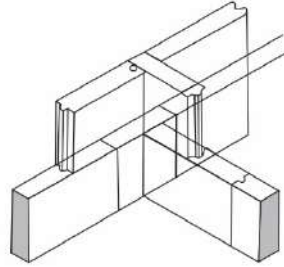
➤ BONDING DETAILS

If there is an inter looking between the blocks, there is no need for using the wire mesh or steel plate in connecting partition walls. The only thing needed is a steel angle or a steel connection between ASLAN blocks and the concrete column each (3-4) layers.

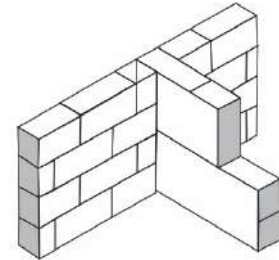
a. CONNECTING BY MASONRY BONDING.



Typical masonry bonding for ACICO blocks. Standard dimensions 60.0 x 25 for different thicknesses.



Typical masonry bonding for ACICO partition wall blocks 60.0 x 50 x thickness.



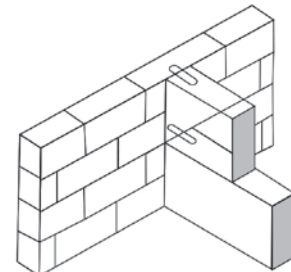
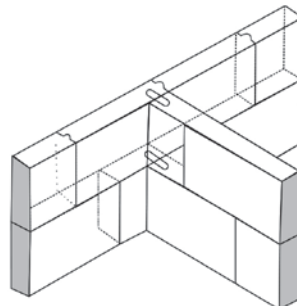
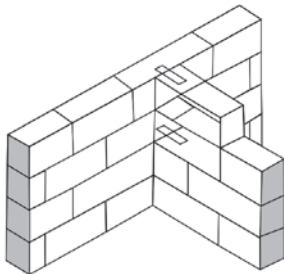
Typical masonry bonding for ACICO blocks height 25 cm with partition wall blocks height 50cm.

b. CONNECTIONG BY STEEL PLATE.

Steel connection is a stainless steel plate in 30cm length and 1mm thickness. The width is 3cm having circular holes allowing glue to pass through it. Also, the holes facilitate fixing AAC nails in locks. The AAC connection is applied to connect ASLAN blocks each 50cm

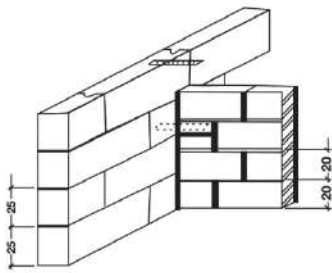


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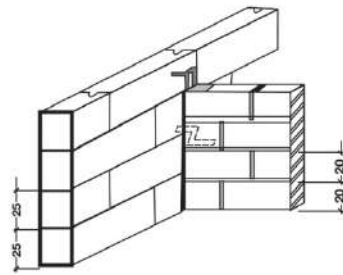


c. WALL BONDING FOR DIFFERENT BLOCK HEIGHTS.

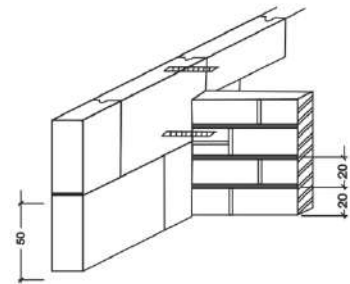
For different blocks heights if there is a difference in the block heights or there is no inter looking between the partition walls then the wire mesh or steel angle should be used to connect these partition walls.



Stainless steel hollow plate with 1 mm thickness in each 50cm height of ASLAN blocks.



Galvanized angle or bent the stainless steel AAC connection in each 2nd layer of conventional blocks. Fix it in ASLAN wall by two AAC nails 100mm length.



ASLAN partition wall block 50cm height with blocks zoom height

d. ASLAN MASONRY WITH CONCRETE SKELETON.

The joints between R.C. elements (columns, beams and slabs) and ASLAN blocks should be filled with cement mortar; all ASLAN joints are filled with thin bed mortar (glue). For the connection of ASLAN masonry with concrete columns, a steel connection such as galvanized angle gracing connection must be applied in 3-4 horizontal course.

e. FIXING OF LINTELS.

Lintels should be laid on ASLAN Lightweight blocks or normal blocks with a minimum of 15-20 cm support at both ends.

*For more details, check Technical data sheet & method of statement for ASLAN lintel.

f. RECOMMENDED COMPANIES FOR ACCESSORIES.

- CATNIC.
- EXMATE.
- Or equivalent.

g. RECOMMENDED COMPANIES FOR FISHERS AND NAILS.

- HILTI.
- FISCHER.
- Or equivalent.



1.2. ASLAN Glue Mortar, Technical Data Sheet & Method of Statement.

➤ DESCRIPTION.

ASLAN Glue Mortar is a high quality, water resistant adhesive for permanently fixing blocks. The product is a cementations powder, available in white or grey that only requires the addition of clean water on site. It has been specially formulated for the tropical conditions of the Middle East and will tolerate wet or damp conditions.

➤ FEATURES.

- High Initial bond strength.
- Economic.
- Water resistant.
- Typical for Middle East Tropical conditions.

➤ USES.

ASLAN Glue Mortar can be used for laying internal and external Autoclaved Aerated Blocks, Lintels and walls Panels.
Concrete

➤ TECHNICAL DATA.

Properties listed are only for guidance and are not a guarantee of performance

Conforms to	: BSEN 196
Appearance	: Powder
Color	: Grey, White
Application Thickness	: 2 – 6 mm
Density	: 1800 Kg/Cu.M
Application Temperature	: 5°C - +35 °C
Pot Life	: 65 minutes
Open Time	: 30 min
Adjustability Time	: 15 min
Setting Time	: 60 min
Open to foot Traffic	: 15 hours
Approximate Yield	: 16.6 liters/25 kg bag
Compressive Strength	: >30N/mm ² BSEN 196



➤ **METHOD OF USE.**

Surface Preparation:

All surfaces should be sound and free of contamination from dust, debris, loose particles of mortar, wallpaper, paint, etc. All traces of oil and grease should be removed with a chemical degreaser.

ASLAN Glue Mortar can be applied directly onto concrete, cement screeds and cement or lime mortar. On new construction.

Mixing:

5 -5.5 liters of water is required for each 25kg bag of ASLAN Glue Mortar. A slow speed drill fitted mixing paddle is recommended for mixing in a minimum capacity of 30L. Always pour the powder into the recommended quantity of water while the mixer is running, slowly add the bag of powder and mix for 3 minutes until a uniform and lump free consistency achieved. It is important that the powder is always added into the water - do not pour water into the powder component.

Application:

- The first line of block should be lined on a traditional bed of cement mortar.
- Applied ASLAN glue with a special toothed trowel and then position the blocks to be leveled. Remove possible excess of mortar before it hardens.
- The glue should be applied in a thin layer to enable the continuity of thermo insulation of the block.
- Leave a space of about 2 cm between the top of the block wall and the bottom of the slab or beam in order to avoid formation of cracks along the wall this cavity should be filled with compressible materials.

Cleaning:

Wet product should be removed from tools and equipment with clean water immediately after use. Cured material should be removed mechanically.

Limitations:

Do not expose to moving water or rain during application.



Packaging & Storage:

ASLAN Glue Mortar is available in 25kg bags and has a shelf life of 12 months when stored in unopened bags, off the ground, under cover out of direct sunlight, and in cool, shaded and dry Ware-houses at temperatures between 2°C and 30°C In extreme tropical climate, the product must be stored in cooled ambience. Excessive humidity and over exposure to UV will result in the reduction of shelf life. ASLAN Glue Mortar is non-flammable.

Health & Safety:

ASLAN Glue Mortar contains cement powders which, when mixed with water or becoming damp, release alkalis which can be damaging to the skin so the use of gloves and a barrier cream is recommended. As with all construction chemical products, caution should always be exercised. Protective clothing such as gloves and goggles shall be worn whilst handling. Wearing long sleeve overalls, safety shoes and face mask is recommended for maximum safety. If any material comes in contact with the skin it should be removed with water – DO NOT use solvent. Treat any splashes to the eyes with fresh water immediately and seek medical assistance. Should any of the product be accidentally swallowed, do not induce vomiting, but call for medical assistance immediately. Spillages of ASLAN Glue Mortar should be swept up and transferred to suitable containers for disposal. The disposal of spilt or waste material should be carried out in accordance with local legislation under the guidance of the local waste regulatory authority.

Limited Warranty:

It is the responsibility of the customer to determine the suitability of the product for the intended purpose. Factors such as temperature, surface preparation and applicator's skill are beyond the control of the company. Therefore, the manufacturer's liability is limited to the replacement of the defective material only.



1.3. ASLAN Repair Mortar, Technical Data Sheet & Method of Statement.

➤ GENERAL FEATURES.

ASLAN repair mortar is specially produced only for the AAC products and is not common in market. The component of the AAC products is the same material which is used to produce the repair mortar and this component to be exactly the same properties of AAC products.

➤ CHARACTERISTICS.

Hemi hydrated lime, white cement, sand and chemical additives.

➤ TECHNICAL DATA.

Appearance	: Fine Powder
Color	: White
Binder	: Hemi hydrated lime
Density	: Dry 1.1 Kg/Lt, Wet 1.6 Kg/Lt
Water Requirement	: 40 %
One Bag 20 kg	: 8 lit
Yield	: 650 lit/ton fresh mortar
Tensile Adhesion Strength	: 0.75 MPa (EN 1348)
Compressive Strength	: 2.19 N/mm ²
Packing	: 20 kg bag
Storage	: 6 moth under dry condition



➤ **SURFACE PREPARATION.**

The substrate must be clean, free from dust & all traces of oil or any other dirt. In the hot seasons the surface has to be sprayed with water.

➤ **MIXING.**

Prepare ASLAN repair mortar in a clean container. Mix 20Kg of repair mortar with 8 liters of potable cool water by using a stirrer, driven by a slow-speed drilling machine. Mix thoroughly until a thick paste is obtained. Keep all equipment and tools clean.

➤ **MIXING.**

The thick repair mortar paste is for repairing the area at any damaged AAC part.

➤ **PRECAUTION.**

Prepare the quantity that is enough for not more than two hours. (in summer season for not more than one hour). In case repair mortar gets dry because of long use – don't mix with water again!

➤ **NOTE.**

This information is given accordingly to our experience & our responsibility can only be engaged in this respect. ASLAN Kuwait denies the all responsibility in case the product is used improperly. This data sheet supersedes all previous literature & all products should be used accordance.

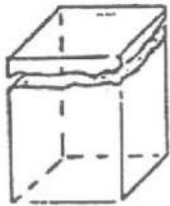


1.4. Repairing Criteria Non-Load Bearing.



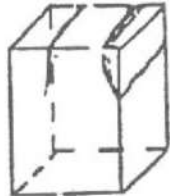
Repair

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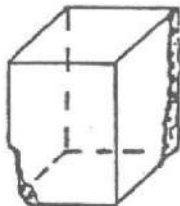
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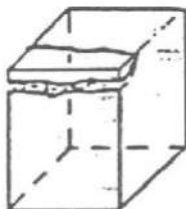
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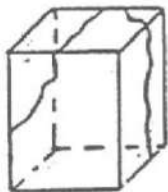
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Repair

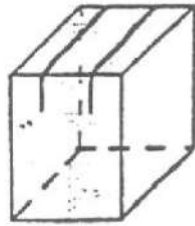
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Repair

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Repair



- ❖ Repair Volume Minimum 10cm and Maximum 20cm of any dimension.
- ❖ In case of using manual or automated chasing machine, after insulated pipes, conduits, Ducts, etc...
- ❖ Back fully the gap, using only ASLAN Repair Mortar and groove width is less than 20cm. No mesh required.



1.5. Other Work.

1.5.1. Conduits & Recesses.

For electrical conduits and piping installation, cut a chase using an electrical router or a chasing tool (slot scraper). To lodge electrical boxes, a power drill (drill bits) or router can be used.

After installation, use ASLAN Repair/ cement-sand mortar to fill the chases. During finishing step, place fiberglass mesh over the repair area according to recommendations.



1.5.2. Plaster Works.

Autoclave Aerated concrete AAC blocks & Wall panels are a cement base so plaster can be applied normally on it. With taking into consideration the strength of material applied which should be $\leq 3.5 \text{ N/mm}^2$.

➤ **Plaster material that can be applied to AAC Blocks or Wall-panels.**

1. **ASLAN Gypsum Lime Plaster.** *(Internal use only).*

2. **Ready Mix Plaster.**

Which is available in Qatar market (it is a mixture that need only to be mixed with water and applied with a thickness between 8 mm to 15 mm after applying thin layer of rush coating material that came special with the plaster (Note compression strength of plaster material should be \leq the compression strength of block. (Applicable if max 3.8 N/mm²)

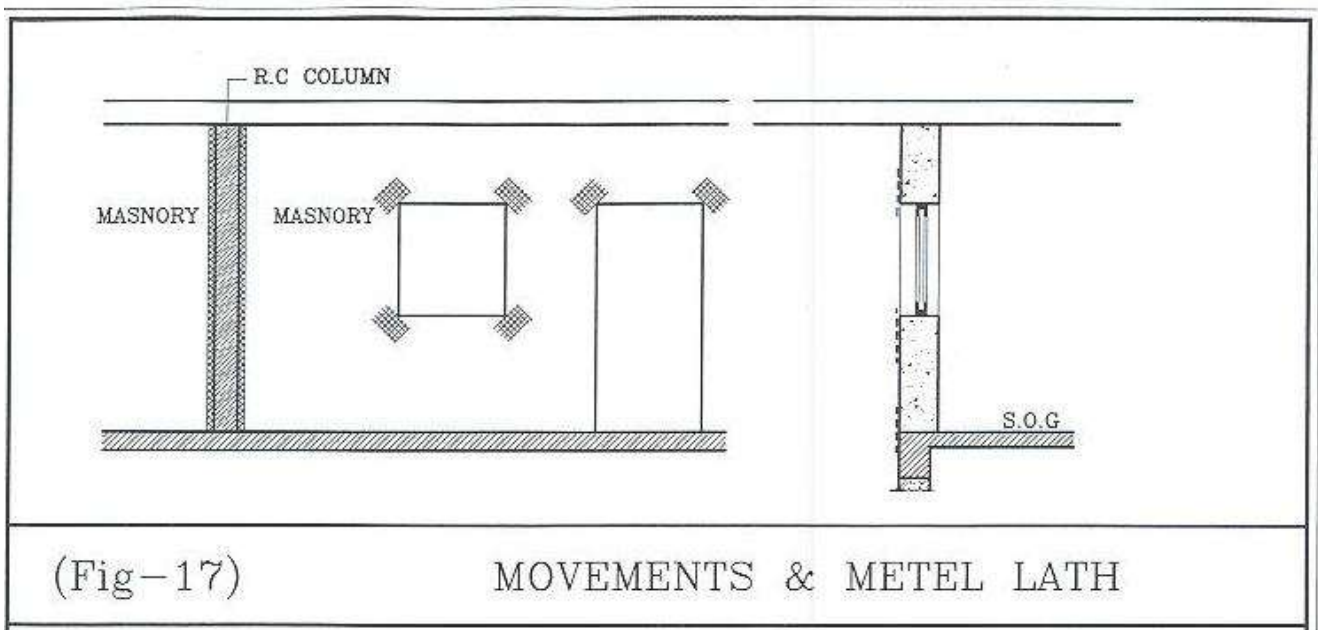
3. **Normal Traditional Plaster.**

Can be used after applying a special layer of rush coating for AAC Block with an average thickness of 8 mm and decreasing the strength of plaster to be approximately equivalent to the strength of AAC Blocks by obtaining a mixture with following portions 5 parts sand 1 part cement and 1 part lime.



➤ **STEPS SHOULD BE FOLLOWED BEFORE START PLASTERING.**

1. Plaster should not start before 1 to 2 weeks before the erection time.
2. In case the high temperature more than 35°C wall should be watered.
3. Using special rush coating materials for AAC Block which available at Qatar market.
4. Surface should be cleaned from dust for high bonding.
5. Repair any chasing, grooves or opened joints before plaster by repair mortar, or by ready mix plaster (Cement for external, gypsum for internal).
6. Big opening should be covered by metal lath (wire mesh) before plastering.
7. All movable joint should be fixed with wire mesh.



1. External plaster should be applied with a minimum thickness of 7-10 mm.
2. Corner and angle beads should be galvanized steel.
3. For readymade plaster increasing or decreasing the quantity of water leads to expected cracks in plaster.
4. Get rid of hardened (setting plaster. Never add water, it is useless).

➤ **CURING.**

Plaster should be watered twice a day for 2 days unless technical detail mentioned other.



1.5.3. Openings Frames (Doors & Windows).

Windows and doors are fixed directly to AAC block without the need of using any stiffeners. We recommend using fishers for light weight block that may be finding at HILTI or Fisher (Plastic Plugs or Steel connection).

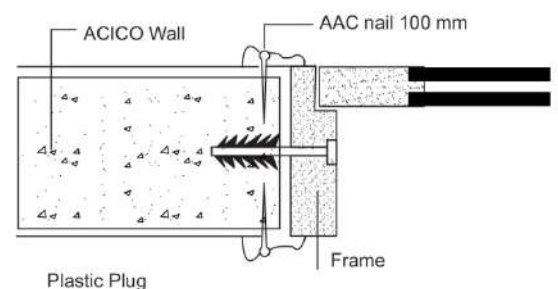
Note: In commercial applications, welded frames with grouted solid jambs and headers are recommended.

➤ **FIXING WOODEN AND METAL FRAMES WITH AAC BLOCK PLEASE BE NOTED THE FOLLOWING:**

1. For single leaf door it is recommended to have 6 plugs in each side with around 35 to 40cm distance between each other.
2. Screw nails 10 cm length with wooden frames while 7.5 cm only is o.k. for metal frames.
3. For double leaf door (in addition to above no.1) the head of wooden frame should have the same fixation.
4. Windows should fix frames all around the four sides.

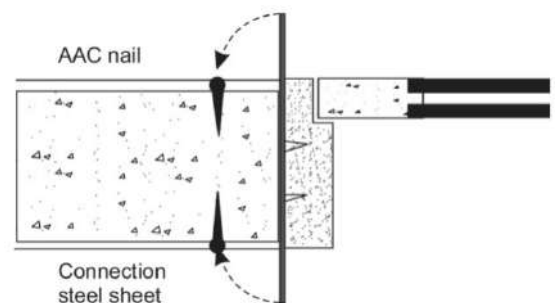
➤ **FIXING BY PLASTIC PLUGS:**

- Set and take alignment other frame.
- Drill a hole through the frame only, but the hole in the wall by hammer and bolt (steel bar) to have a correct and compacted hole.
- Set the plastic plug & fix the frame by a suitable screw.



➤ **FIXING BY STEEL CONNECTION:**

- Fix the sheet by screws on the frame (3 sheets on each side).
- Set the frame and take the alignment.
- Bend the sheet ends to the wall, fix it by AAC Nails.
- Cover the fixing points by plaster.
- For heavy frames, use fisher plugs GB 10 or GB 14.





1.5.4. Cladding Work.

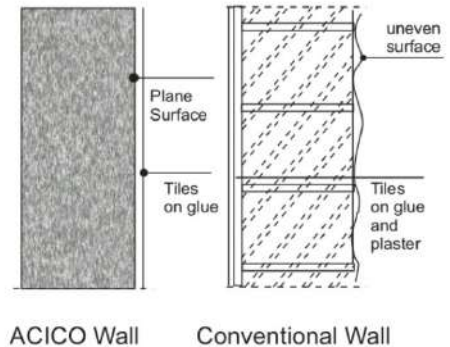
➤ TILING.

a. Internal Tiling.

One of the remarkable advantages of ASLAN walls is the plane surface due to the high quality of ASLAN blocks and thinned mortar bonding.

This advantage allows tiling work on ASLAN walls to be done using the thin bed (cement-glue) method immediately without plaster work. Only, probable uneven spots can be smoothed by a sand paper and wall surfaces must be brushed off with a hard brush before applying the cement glue. Also, it is not necessary to wet ASLAN walls before applying the cement glue.

The cement glue method is ideal for ASLAN walls and results in remarkable advantages. It is simple and saves time. The tiles are merely pressed into place and aligned. - All tiles are seated over their entire area on the understructure. Uniform quality of industrially manufactured and ready-to-use cement-glue. No extra expenditure for mortar material, mixer and labor.



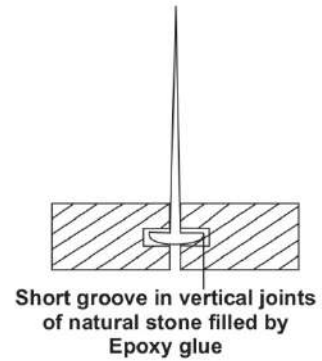
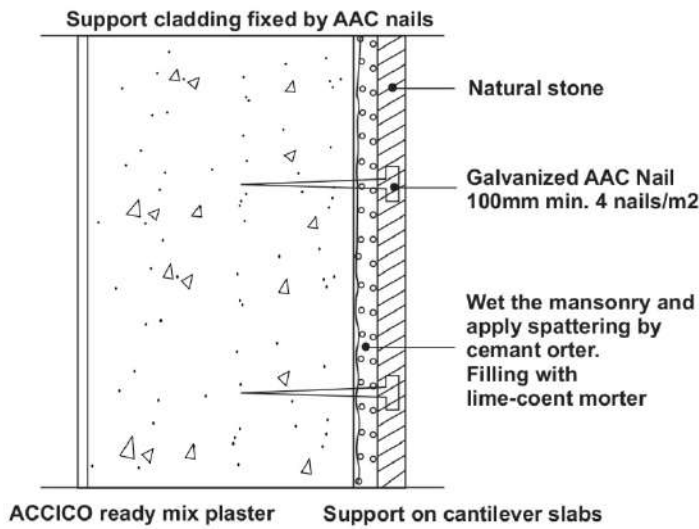
b. External Tiling.

Performance under tough climate conditions, temperature difference, movements and adequate bonding between external tiles and masonry is a vital factor of laying external ceramic tiles.

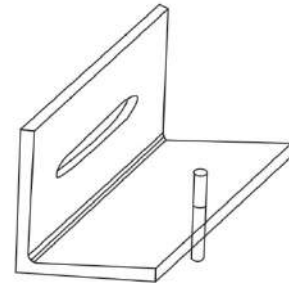
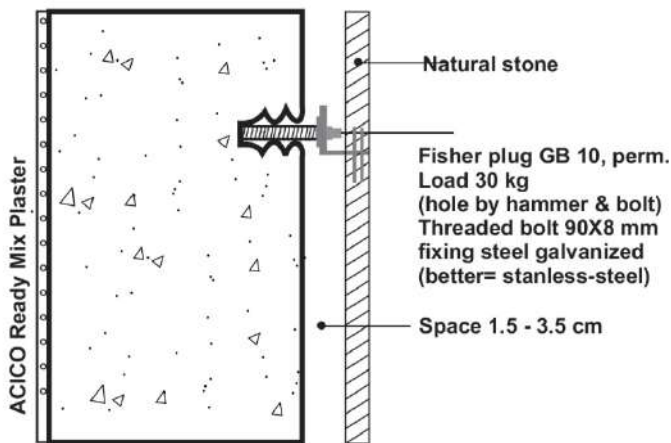
The same bonding (cement glue) method as per internal tiling work is also recommended for external one, but it is not preferred to fill the joints between tiles. Therefore, tiles can expand through these joints which work as expansion joints. Whenever, joints should be filled with cement mortar, expansion joints, filled with flexible material filler should be applied in each 2M of tiles. Further to cement glue method, it is also possible to use thick-bed cement mortar with a mechanical connection between ASLAN Wall and mortar.



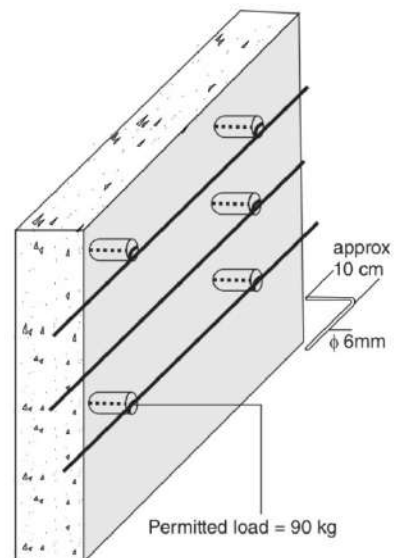
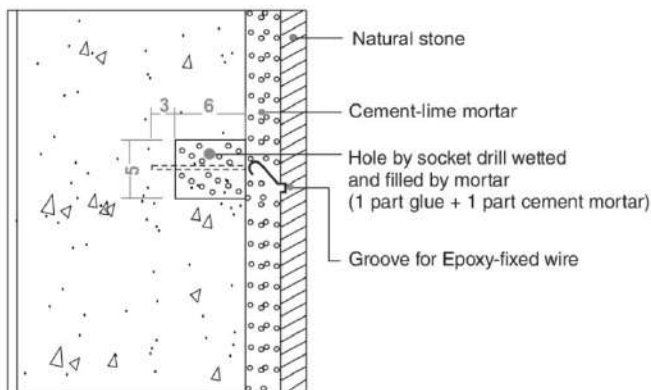
➤ **Natural Stone Cladding (Exterior).**

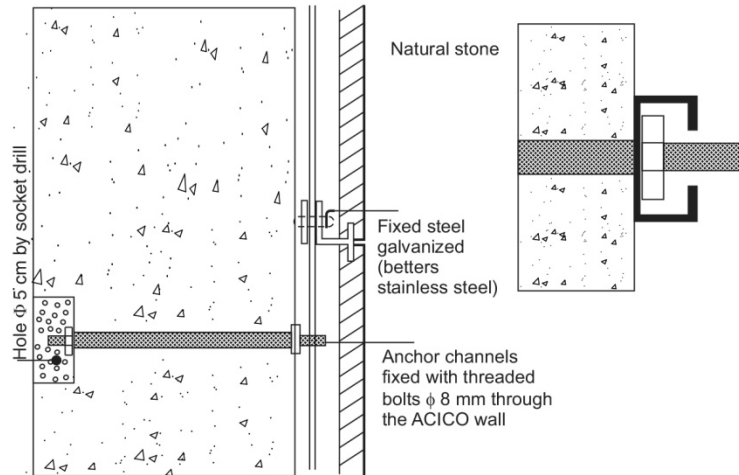
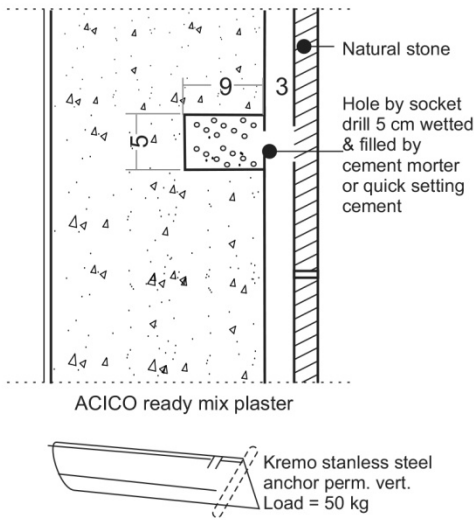


➤ **Cladding fixed by Fischer plugs.**



➤ **Cladding fixed by Mortar plugs.**





➤ **Sand Lime brick Cladding.**

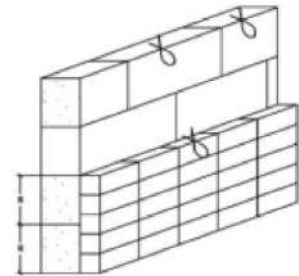
Anchoring Sand Lime Bricks the anchoring must be calculated for 20kg/M² Horizontal loads.

a. Butterfly Wires

Permitted load per wire = 10 kg.

By spacing like sketch are 3 anchorites / M²

Tension load/wire = approx. 7 kg

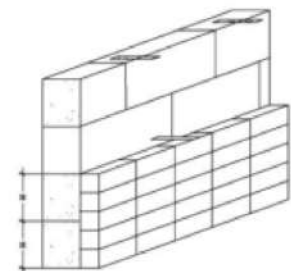


b. AAC Connection Steel Plate

(Stainless-steel) permitted load per plate = 15 kg.

By spacing like sketch are 3 plates/m Tension

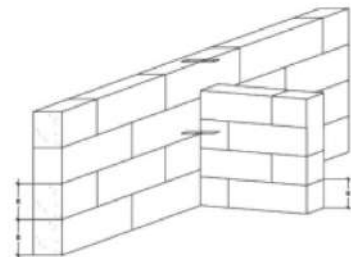
Load/plate = approx. 7 kg



c. Galvanized AAC Nail

Permitted load per nail looms = 7kg Number of nails

Z 4 / m² Tension load/nail = approx. sky





1.5.5. Fastenings

There is hardly any other mineral building material with which anchoring and fastening can be carried out so simple as with AAC lateral. But it should be done as mentioned below:

- **Nails** (for anchoring lighter loads)

Normal nails are unsuitable except for very light loads like pictures act. While conical, galvanized, square nails (GB nails) in different lengths for proper fixing of small loads, wooden or steel strips, etc.

- **Plugs**

Practically all types of commercial plastic plugs are suitable but HILTI or Fisher also supplies special plastic plugs (Fisher GB) for anchoring relatively heavier loads. But in all cases holes should not be made by electric drill. Hammer should be used to make the hole by hammering round steel bolt or an awl of the same diameter as the plug. By hammering, material compaction and a correct hole-diameter can be achieved to get higher frictional value.

- **Threaded bolts**

Heavy point loads can be fixed with threaded galvanized bolts as shown in figure. Electrical drill should be used for this case.

➤ **PERMISSIBLE LOAD FOR FIXING MATERIALS**

Fixing materials	Permissible load (kg)	Remark
Normal Nail	-	
AAC Nail 100 mm	7	
AAC Nail 150 mm	12	
Fischer plastic plug s10	30	Hole by hammer and bolt
Fisher plastic plug s14	40	Hole by hammer and bolt
Thread bolt/ 8 mm	100	
Thread bolt/ 10 mm	200	