AAC Block Construction Specification

1. General

This section relates to the setting out, cutting, laying, gluing, reinforcing and grouting of AAC concrete blocks.

The following abbreviations apply specifically to this section:
- AAC = Autoclaved Aerated Concrete

2. Documents

The following documents are specifically referred to:
AS/NZS 1170.2 Structural design actions - Wind actions - New Zealand
AS/NZS 2904 Damp proof courses and flashings
NZS 3109 Concrete Construction NZS 3604 Timber-framed buildings
NZS 4210:2004 Masonry construction - Materials and workmanship
NZS 4229 Concrete masonry buildings not requiring specific engineering design
AS/NZS 4347 Damp proof courses and flashings - method of test
AS/NZS 4455.1 Masonry units, pavers, flags, and segmental retaining wall
units - Masonry units
AS/NZS 4671 Steel reinforcing materials

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

MANUFACTURER / SUPPLIER'S DOCUMENTS
Manufacturer/Supplier's documents related to this section are:
AAC block - detail drawings - alternative solution to E2-AS1 Masonry
AAC product catalogue - blocks, lintels and mortar

Manufacturer/supplier/contact details
Company: Aerated Concrete Limited
Web: www.aeratedconcrete.co.nz
Email: info@aeratedconcrete.co.nz
Telephone: (021) 2769 117

3. Warranties

WARRANTY - MANUFACTURER/ SUPPLIER
Provide a material manufacturer/supplier warranty:
10 years: For AAC block manufacturers defects
Provide this warranty on the AAC manufacturer/supplier warranty form.
Commence the warranty from the date of practical completion of the contract works.

WARRANTY - INSTALLER / APPLICATOR
Provide an installer/applicator warranty:
8 years: For AAC block installation
Provide this warranty on the AAC installer warranty form – Commence the warranty from the date of practical completion of the contract works.

4. Requirements

NO SUBSTITUTIONS
Substitutions are not permitted to any specified AAC, AAC concrete masonry or associated products.

QUALIFICATIONS
Block layers to be experienced competent workers familiar with the required AAC block laying system. No special qualifications are required; however the block layers shall have had instruction and training from AAC staff or other experienced AAC masons.

CONSTRUCTION OBSERVATION
Inspection to be carried out at critical stages, including set out, reinforcing, and prior to and during grouting. Where inspection is required as a condition of the building consent, advise the engineer when inspections are required. Obtain the PS1 producer statements required from the engineer relating to the masonry construction and keep with the building consent documentation.

QUALITY RECORDS
Keep accurate records relating to the construction, and make the information available to the Building Consent Authority inspector on request.

5. Performance

PERFORMANCE, WIND
The design wind pressures are to NZS 3604, up to and including Extra High Wind Zone. The details and information contained in the AAC Technical Manual and the NZ Addendum are suitable for these conditions.
SPECIFIC DESIGN, WIND
The design wind pressures are to AS/NZS117O.2, for specific design wind zone (beyond Extra High Wind Zone). Only specifically designed or approved details included in the contract documents can be used.

6. Tests

TESTS
Carry out all required tests to NZS 4210: appendix 2A, Compressive strength tests for mortar and grout.
RECORDS OF TESTS

To NZS 4210 and kept on site.
- spread of grout tests
- grout suppliers test certificates
- mortar

COMPRESSIVE STRENGTH OF GROUT
If requested, carry out tests to NZS 4210: appendix 2A, Compressive strength tests for mortar and grout, with 3 specimens per test.

COMPRESSIVE STRENGTH OF MORTAR
If requested, carry out tests to NZS 4210: appendix 2A, Compressive strength tests for mortar and grout, with 3 specimens per test.

EXPANSION OF GROUT
If requested, carry out tests to NZS 4210: appendix 2C, Test for expansion of grout.

7. Materials

BLOCKS
To AS/NZS 4455
Brand: AAC
Width: 300mm, 250mm, 200mm, 150mm, 100mm and 50mm.
Height: 200mm
Length: 600mm

FACING BLOCKS
Brand: AAC
Width: 100mm and 50mm
Height: 200mm
Length: 550mm

REINFORCEMENT TIE RODS
M12 Zincalume coated threaded rod to AS/NZS 4671 in 3000mm lengths with separate 300mm starters and connector sleeve nuts. Locally sourced by the builder including Hilti HY150 epoxy injection adhesive or Powers C100 epoxy adhesive for adhering starters into footings.

TIES
Wall ties and Control Joint ties shall be placed every second course where required. Ties shall be placed with the knuckle facing up to prevent them filling with debris and AAC Thin Bed Adhesive.

THICK BED CEMENT MORTAR (FOR FIRST COURSE ONLY)
Use site mixed Thick Bed Cement Mortar. Compressive strength of not less than 12.5 MPa. Mortar to first course only. All other joints are glued with AAC thin bed adhesive, supplied with the AAC Block System.

GROUT TO TIE ROD HOLES
To NZS 4210, section 2.3. sand /cement mix. Spread value 450 – 530mm. Design strength - 15 MPa at 28 days. This grout is used to fill the holes around the vertical tie-down rods only.

AAC THIN BED ADHESIVE
AAC Adhesive supplied in 25kg bags, mixed with water on site as per instructions and applied by trowel onto each edge joint.

WATER
Clean, fresh and free from excess alkali, salt, silt and organic materials. Water from a territorial authority/NUO water supply is acceptable.

8. Components

DAMP PROOFING
DPC to AS/NZS 2904 and AS/NZS 4341; The DPC is to act as a slip joint as well as protecting the bottom course of AAC blocks from dampness.

DPC is also added to the finshed top wall before the timber top plate. Top plate nuts should never be over cranked and the top plate hole should be over size to allow for wood expansion.

AAC TANKING MEMBRANE
Liquid applied damp-proof membrane for concrete seating rebate.

9. Coating Components

Base render coat option.

AAC
Key coat for over AAC and other substrates.

AAC GRID MESH
5mm grid polymer mesh sheet.

AAC SURFACE SEALER
Concrete surface sealer.

AAC thick cementitious adobe texture coat.

SEALANTS
Paintable Holdfast, FIX ALL 22OLM MS sealant in accordance with the AAC Technical Manual and set against backing rods where necessary.

10. Conditions

EXECUTION COMPLIANCE
Comply with NZS 4210.

DELIVERY
Keep products dry in transit. Take delivery of products dry and undamaged. Deliver all materials in original unopened packaging with labels intact.

STORAGE
Provide dry, covered well ventilated storage on site, clear of ground. Stack materials carefully, and protect from mechanical damage. Keep bagged materials off concrete surfaces on a timber pallet.

CONFIRM LAYOUT
Confirm the rebate type, starter rod and movement control joint layout, and bond beam type before commencing work.

BLOCKWORK GENERALLY
AAC has only 2 - 3mm thick adhesive joints so there is little scope for correcting bad alignment by packing the joint as with mortared block work.

AAC is forgiving in that it can be sanded back into alignment, however much work will be saved if the first course is accurately laid, true and plumb.

MOISTURE CONTENT
Ensure that blocks are air-dry prior to laying.

TOLERANCES
Construct within the tolerances set out in NZS 4210: clause 2.6.5, Tolerances and clause 2.7, Laying the units, unless specified otherwise on the drawings or in this specification. Lay blocks with jointing of consistent thickness throughout. Lay masonry to an even, plane surface with no deviation exceeding 3mm in 3 metres on any surface in view in the finished work.

CHECK BASE
Ensure the base concrete on which masonry is being built is smooth, true to line and level, requiring a base mortar bed of 10mm (minimum) to 20mm (maximum). The Thick Bed Mortar is laid over the DPC and is used to level the first course. It is critical that no stones or concrete lumps protrude from the rebate that may catch on the bottom edge of the panel and prevent slippage.

COVER
All cover shall be in accordance with NZS 3109: 3.8 Cover and 3.9 Tolerances for reinforcement. Vertical tie down rods should be located centrally within the wall or as

detailed by the engineer.

STARTER POSITIONS
The 12mm threaded rod starters are positioned by the Engineer on the plan. Ensure that the pattern of rod set-out is strictly adhered to. Do not correct misplacement by cranking bars. Where misplacement exceeds the location tolerance, obtain written direction before proceeding or drill and adhere new starters in the correct location. Each starter should protrude from the slab a minimum of 100mm, but no more than 1 course height (200mm). Ideally, embed 150mm into the concrete with 150mm protruding.

SLEEVE NUTS
Fit sleeve nuts to each rod starter to protect the thread of the starter during construction. The sleeve nut enables the connection of the starter to the vertical tie down rods. Protect the nut by taping over it to prevent adhesive over spill from clogging the thread.

CUT-OUTS AND DRILLED REINFORCING HOLES
First course blocks are cut out to allow access to the starter. Subsequent courses are drilled using 50mm diameter Tungsten tipped spade bit. Once the penultimate course is laid & drilled, insert 3000mm lengths of threaded rod (supplied) into the aligned drill holes. Connect to the starter with the sleeve nut. Grout the rods in place (see Grout section notes). The next course is normally the bond beam (See bond beam details). Tie the bond beam longitudinal steel to the vertical tie rods.

PROTECTION
Keep fair face block walls clean of adhesive and grout splashes, or stains of any kind as the work proceeds and before any droppings set, and protected from weathering prior to sealing to avoid instances of damage and staining.

WEATHER PRECAUTIONS
When extreme temperatures prevail, either below 4°C or above 27°C, make adjustments to construction as listed in NZS 4210: clause 2.18, Cold weather construction, and clause 2.19, Hot weather construction. Do not use expansive grout for filling in temperatures below 5°C. Do not use AAC adhesive outside the specified temperature range of 10°C – 30°C.

11. Application

SELECTION
For fair face walls select blocks for consistent colour, texture and lack of imperfections. Refer to PROTECTION.

YONG TANKING MEMBRANE
The liquid applied damp-proof membrane shall be applied to coat the entirety of the concrete seating rebate prior to laying the DPC.

DAMP-PROOF COURSE
Before laying the first course of AAC , lay a bituminous damp-proof course membrane, such as Bitumac Malthoid DPC. Lay the DPC over the foundation, to the perimeter and along the lines of all internal walls. Neatly cut around all starters. The DPC placed between the two types of concrete creates a slip joint for differential movement between slab and walls and also provides a moisture barrier to protect the AAC from dampness. The roll of DPC should be the same width as the wall thickness.

BONDING PATTERN
Unless specifically shown or described otherwise in SELECTIONS, lay masonry in stretcher bond with full masonry bonding at intersections. Each block should overlap the vertical glue join in the course below by a minimum of 100mm.

CUTTING
Cut using a masonry saw to provide clean, accurate cuts.

BOTTOM COURSE
The bottom course should be bedded on a 10mm - 20mm thick Mortar bed. The thick bed mortar is laid over the DPC and is used to level the first course. Pack out with packing blocks where required.

CONSTRUCTION
Where shown on the drawings or where nominated below, construct walls using AAC block. Lay the first course with mortar to ensure a level starting point. Erect the remainder of the wall by gluing the blocks with AAC Adhesive in a stretcher bond pattern, joints not exceeding 2-3mm thick. The teeth of the notch bed trowel will spread the AAC Adhesive to the appropriate depth. Note that perpendicular and all AAC to AAC edges should be glued to these specifications. Refer to AAC block -detail drawings - alternative solution to E2-AS1 Masonry.

BOND BEAM
To NZS 4229. AAC bond beam to the top of all external and internal AAC block walls. Typically 50mm or 100mm thick AAC facing blocks form the sides of the continuous bond beam, together with two D12 reinforcing bars which are placed centrally in the core, and tied to the vertical tie rods. The core is then typically filled with 17.5Mpa cast in-situ concrete.

PRE-GROUTING INSPECTlON
Inspect walls prior to grouting. Ensure that the 50mm grouting core holes have been continuously cleared of all AAC debris and that grout can flow freely around the tie down rods.

GROUTING OF HOLES
Use a free flowing sand/cement grout. Grout all holes, shaking the reinforcing as it is grouted to ensure complete filling of the drilled cavity. Drill bleeder holes at regular intervals up the first core to be poured. Plug each bleeder hole as the grout fill reaches that level. This ensures that the hole is being filled correctly. By measuring the quantity of grout required

for this core, all other cores can be confidently filled using exactly the same amount (without the need for bleeder holes to every core). If smaller diameter holes have been drilled, use shrinkage compensated grout. Ensure cover blocks of AAC are fixed over the starter access to prevent grout flowing out.

CLEANING JOINTS
After each block is laid, run the trowel across the joint to remove any adhesive that has over spilled or been squeezed out. At the end of each day scrape the wall down to remove any small droppings of adhesive. Left to cure overnight, these will prove more difficult to remove the next day. Keep the block work as clean as possible (a little over spill is acceptable and shows that the block surfaces have full adhesion - a perfectly clean wall surface indicates insufficient adhesive use and therefore less wall strength).

TOOLS
Use the tools provided to lay the block. A band saw will provide faster and less dusty cutting.
Tools included are:
- Handsaw
- Steel Square
- Adhesive notch bed trowels, (assorted sizes depending on block thickness)
- Sanding float
- Hand Router
- Rubber mallet
- Leveling plane
- 50mm spade bit.

BRACING
No temporary propping of the wall is necessary, unless in an extremely high wind zone, or where a wall forms a single plane with no returns. The wall bracing is achieved when the vertical tie down is installed, grouted in place and connected to the top course bond beam. If in a high wind area provide sufficient temporary lateral bracing to ensure stability until the final supporting construction is in place.

FEATURE AND BAND COMPONMENTS
Use AAC Adhesive to attach any AAC components such as sills, parapet capping, window surrounds and decorative feature work. Until the adhesive sets it may be necessary to nail the item in place.

RENDER STOP
Staple or tack the Render Stop along the bottom outer edge of all exterior wall blocks and along the head outer edge of large openings to act as finishing line for render.

12. Application - ancillary work

CHASE OUT FOR SERVICES
Chases for services can be produced by use of an electric router, or more typically by running

two parallel saw cuts up the wall (with a power chasing tool or circular saw) and scrape out the waste between with the hand chasing tool supplied. Chasing for low level power points and plumbing fittings can be reduced if these services are installed in the slab edge and conduited into the first course. Chasing must not exceed 1/3rd of the thickness of the wall on the vertical and 1/5th on the horizontal.

CONTROL JOINTS
Locate where shown on the drawings. They should be at not more than 6 metre centres. If not indicated on the drawing the Engineer should be notified to ensure optimum placement for structural integrity. Where bond beam reinforcement passes through a control joint, provide for breaking bond using methods detailed on page I-28 of the NZ Addendum of the AAC Technical Manual, unless specifically detailed otherwise. Place control joint ties every second course and place a foam backing rod & flexible sealant into the joint. Joint width should be a nominal 10mm.

BUILT IN FIXINGS
Build in all necessary plugs, bolts, ties, metal flashings, dowels, fastenings and fixings required by this and other work sections. Co-operate with others to meet this requirement.

WEATHERPROOFING AROUND OPENINGS
Refer to architectural drawings for weatherproofing details around openings. Typically all openings will be set back into block work 50mm minimum and face sealed with approved sealant installed over a AAC Tanking Membrane. Otherwise they will have the typical 10mm nominal movement control joint installed around them.

13. Application - finishing systems

INSPECTION
The Applicator shall inspect the AAC panel surface to be coated and report to the main contractor if the applicator believes that work cannot be completed to the required standard due to the condition of the panel surface.

PROTECTION
All adjoining surfaces and areas susceptible to damage from coating or paint over-spill must be covered and protected accordingly by the applicator.

HARDWARE REMOVAL
Remove, or mask and protect any hardware or fittings and replace upon completion. Do not coat or paint over permanently attached hardware items which cannot be removed.

PRIMING & SEALING OF JOINTS
Ensure that all priming and sealing to control joints, openings and penetrations is complete prior to applying paint finishes, if primer is a requirement of the sealant manufacturer.

EXTERNAL ENVIRONMENTAL CONDITIONS

Ensure that work is conducted within the acceptable temperature range of each product as per the applicator and technical data sheets.

PREPARATION OF SUBSTRATES & CORRESPONDING SURFACES
Prepare all surfaces to be coated to the specified requirements.

APPLICATION
Apply AAC coat by trowel to the thickness and finishing requirements of the system specifications. Press AAC Grid Mesh into the base coat between coats.

BETWEEN COATS
Between the layers of the coating system remove any dust pick up, protruding fibres and/or coarse particles.

FINISHED AAC TEXTURE RENDERED SURFACES
All finished rendered surfaces are to show surface uniformity in accordance with the clients chosen finish selection.

14. Completion

PROGRESSIVE CLEANING
Clean off mortar splashes and grout spills as they occur.

FINAL CLEANING
At completion, clean down block work, remove efflorescence and remove waste materials from adjoining surfaces and floors.

REPLACE
Replace damaged, cracked or marked elements.

REMOVAL OF MATERIALS
Removal from the site materials not used. Excess stock delivered to the site belongs to the AAC Distributor as per the supply contract. Dispose of all cut & damaged block.

SELECTIONS
Substitutions are not permitted to the following, unless stated otherwise.

MASONRY UNITS
Brand: AAC

Size: 550mm x 200mm x ~mm
Bonding pattern: Stretcher bond

LINTELS
Brand: Precast AAC lintels
Type/size: to suit location

VERTICAL REINFORCING
Length: 3000mm long
Diameter: M12
Coupling nuts: with reinforcing

BOND BEAM
Size: ~mm deep x ~ mm wide
Reinforcing: ~

AAC THIN BED ADHESIVE
Brand: AAC Adhesive supplied in 25kg bags

GROUT
Use site mixed to NZS 4210, section 2.3. sand /cement mix. Spread value 450 – 530mm. Design strength - 15 MPa at 28 days. This grout is used to fill the holes around the vertical tie-down rods only.

THICK BED CEMENT MORTAR
Use site mixed Thick Bed Cement Mortar. Compressive strength of not less than 12.5 MPa. Mortar to first course only.

BITUMINOUS DPC
Manufacturer: Bitumac Malthoid or similar

SEALANT JOINTS
Type/Brand: Holdfast, FIX ALL 22OLM
Backing rod: Holdfast 13mm PEF

14. Detail Accessories

ACCESSORIES
AAC blocks: 550 X zoo X ~mm
Render Stop: Plastic angle and polymer mesh

15. Exterior coating system

FULL MESH ADOBE OR SIMILAR BREATHABLE RENDER
1st coat: up to 2mm
Reinforcing: grid mesh pressed into surface
2nd coat: ~ (float coat to conceal mesh)
Insert control joints
3rd coat: texture coat up to 3-8mm patterned as selected
4th coat: surface sealer 25 microns DFT