

**TECHNICAL SPECIFICATIONS FOR CONSTRUCTION: GENERAL CIVIL,
STRUCTURAL & ARCHITECTURAL WORKS**

Bakoteh Skills Centre - Loom Hall

INTENT OF SPECIFICATION

This specification is intended to cover materials and construction of all civil, structural and architectural works for installation and commissioning of the proposed buildings.

SCOPE OF WORK

The scope of work of civil, structural and architectural works shall include all works related to the installation and commissioning of the buildings and its auxiliaries whether specifically mentioned or not.

The work to be performed under this specification consists of providing all labour, materials, plants, equipment, temporary work, construction of buildings and maintenance till handing over, transportation and all incidental items not specifically stated but reasonably implied or necessary for the proper and successful completion of the work.

TECHNICAL SPECIFICATIONS

A. GENERAL REQUIREMENTS & PRELIMINARIES SPECIFICATIONS

1. GENERAL

1.1 Regulations

The Works shall comply with the provisions of the Gambia Physical Planning and Development Control Act 1991.

1.2 Material and Workmanship

Materials and workmanship shall comply with the relevant British Standards (BS) and/or codes of Practice (CP) or other internationally recognized standards/codes.

Where goods or materials of a particular manufacturer are demanded, the Contractor shall allow for these. Similar goods or materials of different manufacturer may be approved for use if equal in quality, properties and design.

Goods and material used shall be compatible with one another and be kept clean free from damage during the courses of the Works.

Workmanship shall be to the satisfaction of the Consultant and any work rejected shall be taken down, removed completely from site and re-executed by the Contractor at his own expense.

Each part of the Works and the whole of the Works shall be left clean upon completion.

3. Testing

Contractor must submit samples to be tested at a time, which will enable the results of the test to be assessed by the Consultant before the relevant material, or component is used in the works.

4. Inspection of Site

Contractor is instructed to visit the site prior to tendering and to acquaint him/herself with work environment, accessibility of the premises limited space for storage of materials, the availability of the water supply and electricity, sand and stone aggregate sources, and conditions under which the work has to be done.

No claim for variations, alteration or additional payments will at any time be considered or admitted on the grounds of lack of knowledge in such respects.

5. Setting Out

The Contractor shall set-out the works in accordance with the dimensions shown on the drawings and to the requirements of the Engineer/Consultant. Where a discrepancy or error is noted, notice must be given to the Consultant and a period of at least 3 days allowed for the Consultant to prescribe a solution.

6. Order of works

The works shall be carried out within the time stated in the form of tender / contract signed.

7. Form of Contract

The form of contract will be prepared according to ITC's Standard format of contract for works, a copy of which will be issued to the Contractor with the other tender documents.

8. Labour Costs

The Contractor is to allow in his price for all payment and obligation under any labour agreement and legislation including all allowance for guaranteed day, leave pay, sick leave with pay.

9. Overtime

No claim for overtime payment shall be entertained unless the overtime has been specifically noted and agreed to, in writing, with the Engineer/Consultant before its commencement, any other overtime worked shall be at the Contractor's expense.

10. Existing Services

Existing drains, pipes cables and other services if any are to be protected from injury by the Contractor, and maintained by him/her in full and uninterrupted use during the construction period.

11. Temporary Roads

Provide any temporary roads or tracks required for the proper execution of the works and maintain, or adapt as necessary and clear away and make good on completion.

12. Plant, Tools, Scaffolding, etc

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Provide paint scaffolding, tools, labour and materials together with everything necessary for the proper execution of the works. Adopt, shift and maintain in proper sequence and remove away any plant, tools, surplus material upon completion of the works.

13. Transport

Provide all transport to and from the site and pay all costs connected therewith.

14. Ordering Materials

On receipt of the order to commence work, the Contractor is to make a review of the materials required for the proper execution of the works and is to place orders for such materials without delay.

15. Filling in Holes and Trenches

Immediately on completion of any of the work, and following inspection of same, the Contractor shall fill in all holes and trenches and clear away any surplus material or rubbish arising therefrom.

16. Water

Provide and maintain a proper clean water supply together with drinking water for workpersons, and pay all charges in connection therewith.

Allow for use of water to all trades and any sub-Contractor and nominated suppliers. Clear away and make good on completion

17. Materials other than Specified

All materials not fully specified herein shall be of first class quality and the Engineer/Consultant shall have the right to determine whether or not materials may be suitable for the works.

18. Handling and Storage of Materials

The materials for incorporation into the works shall be handled with due care, and when not required for immediate use shall be adequately stored and protected having particular regard to the type of materials, climate, position of store and other relevant matter.

19. Nuisance

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No nuisance shall be committed upon or around the works such as interfering with or blocking any right of way or light to adjoining property.

20. Pest Control

The Contractor shall open up any termite nests on the site and take effective measures to exterminate and prevent such pests.

21. Keep site Clean and Sanitary

The site must be kept in a clean and sanitary condition and no ground shall be fouled or disturbed so as to become a breeding ground for mosquitoes, termites or other pests.

22. Toilet Facilities

The Contractor shall provide/make arrangements for and maintain adequate and satisfactory toilet facilities for the use of site staff and clear away and make good on completion.

23. Welfare and safety Measures

The Contractor is to allow for providing, maintaining and clearing away upon completion, safety measures and amenities to an approved standard for workmen on the site. The Contractor's attention is drawn to the relevant legislations, and he is to allow for fulfilling his obligations under these legislations.

24. Temporary Office for Engineer's Representative

Provide and maintain a suitable temporary office for an Engineer/Consultant Representative with desk, stool, and washing facilities and attendance and clear way on completion.

25. Lighting and Power for the Works

The Contractor is to provide and maintain temporary lighting and power required, for the whole of the Works including sub-Contractors work and pay all charges in connection therewith and clear away and make good on completion.

26. Temporary Watching, Lighting and Fencing

The Contractors shall provide all temporary watching, lighting, fencing etc. that may be required in connection with the works for the proper protection of the public and his

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workmen. The Contractor shall maintain and keep clear any public footpath and highway adjacent to the site.

27. Attendance

Provide all necessary attendance on general and nominated sub-Contractors.

28. Trespass

The Contractor shall take the necessary steps to prevent the access of unauthorized persons to the works, and shall see to it that his own workmen must not enter upon adjoining property, without the necessary permission first being obtained by the Contractor in writing, and he shall see to it that such encroachment is strictly limited.

29. Care of the Works

The charge and care of the Works shall be at the expense of the Contractor until such time as they are handed over and accepted as completed. The Contractor is to provide all requisite security by day and night and will be required to make good loss by theft or damage done to the works at his own expense.

30. Protection of the Works

The Contractor shall provide all proper and sufficient cover and protection for the whole of the works from damage by weather, traffic or otherwise. Any work damaged or soiled by weather, traffic or other causes shall be taken down and re-executed or otherwise made good at the Contractor's expense.

31. Protection for Working During the Rains

The Employer shall require the Contractor to maintain, whenever practicable, continuity of working and productivity during the rains. The Contractor will be expected to avail himself of all reasonable means and aids to building during the rains and to use his best Endeavour's to minimize any delay. Consideration will be given to this by the Engineer/Consultant in assessing claims for extension of time under the contract.

32. Diversion of Storm Water

Provide as necessary for the diversion and disposal of storm water from the site during the progress of the works

33. Keep Records

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The Contractor is to keep an accurate record, with dates, of the weather, temperature, visitors and any other events influencing the progress and quality of work.

34. Removal of Rubbish

The Contractor must clear up and remove rubbish as it accumulates during the progress of the works, including that of sub-Contractors, and nominated sub-Contractors as directed by and to the entire satisfaction of the Engineer/Consultant.

35. Figured Dimensions

Figure dimensions on the drawings are to take preference over scale dimensions in all cases.

36. Notice of Inspection

The Contractor is to give written notice to the Engineer/Consultant as least 24 hours before any work that has to be specially inspected is ready for inspection. The Contractor will be required to uncover any such work which may have been covered up with out such notice being given and reinstate after inspection at his own expense.

37. Progress Schedule

The Contractor shall produce a time and progress schedule. One copy of this shall be given to the Engineer/Consultant, and one copy shall be retained in the Contractor's Office on site and kept up to date by him.

38. Checking Schedules, Drawings etc.

The Contractor shall submit to the Engineer/Consultant, within on week from the date of the order to commence, all drawings of specially manufactured items (non-standard elements not included in the drawings), which required the Engineer/Consultant at least 14 days before the works concerned are to be executed.

39. Chases, Holes, Plugs etc.

The Contractor shall check from the drawings or by consulting the Engineer/Consultant and all nominated sub-Contractors and specialist tradesmen Appointed by the employer, the positions of all holes, recesses, plugs, etc which may be required, in time to form these as the works proceed. If, through the Contractor's neglect in this respect, alterations have to be effected, the Contractor shall carryout the alterations at his own expense or at the expense of the sub-Contractor's work.

40. Returns

The Contractor is not to display any other notice or advertisement in any form on any part of the site detailing the number of people employed on site and their appropriate trade and category and also copies of delivery notes for all materials delivered including work accomplished.

41. Advertisements

The Contractor is not to display any other notice or advertisement in any form on any part of the site, buildings or adjoining ground without the prior approval of the Engineer/Consultant.

42. Importation of Goods

All the materials, stores and equipment required for the full performance of the contract by the Contractor must be obtained through normal trade channels unless otherwise stated. The Contractor must include in his prices for all expenses for charges in connection with the lading and shipment of plant, with materials and other things loaded or brought into or dispatched from the Gambia by the Contractor for the purpose of this contract port dues, lighter age, carnage and other similar charges shall be borne by the Contractor whether included in the shipping costs or not.

Customs duty waiver applies to all materials imported for this work and Contractor must allow for these in its prices.

2. CLADDING / COVERING

2.1 Trapezoidal Profile Sheeting

Roofing sheets will be `Single span`, Aluzinc with a thickness of 0.40mm, and a profile height of at least 22mm.

Sheeting shall be laid and fixed in accordance with the manufacturer's printed instructions or as directed by the Consultant. Side laps shall be of not less than one corrugation and shall be turned away from the prevailing wind.

Fixing holes to roof sheets shall be drilled from above in all cases and sheets fixed through the crowns of the profile with hook bolts, nuts and plastic weather proof washers.

2.2 Accessories

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Accessories will suit the profile of the cladding. Ridge capping will be in lengths not less than 1.8m, and shall be lapped at least 150mm at ends. Fixing shall be in accordance with the manufacturer's printed instruction.

2.3 Protect the Works

Ladders or crawl boards shall be used to avoid any walking on the sheets and rolls of the felt. The Contractor is to case up, cover and adequately protect all roofing work and delivers the roof in a sound and clean condition.

B. TECHNICAL TRADES SPECIFICATIONS

3. DEMOLITION / ALTERATION

3.0 Survey

Before starting work, carry out a survey and submit a report and method statement covering all relevant matters listed below and health and Safety Implication.

- Condition and demolition methods of the structure(s)
- Removal methods of any hazardous materials.
- Type and location of adjoining or surrounding premises which The Works may adversely affect.
- Identification and location of services.

1. Extent of Demolition

Subject to the retention of features, structures, etc., specified elsewhere, demolish structure(s) down to slab level.

2. Location of Services

Locate and mark the positions of services affected by the work. Arrange with the appropriate authorities for the location and marking of the positions of mains services.

3. Disconnection of Services

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Before starting demolition arrange with the appropriate authorities for the disconnection of services and removal of fittings and equipment.

4. Services which are to remain

Notify the Consultant and Service Authority or owner of any damage. Make all arrangements for repair to the satisfaction of the Consultant and service Authority or owner. Bear any costs arising.

5. Workmanship generally

Demolish structure(s) in accordance with BS 61897

- Site staff responsible for supervision and control of the work are to be experienced in the assessment of the risks involved and in the methods of demolition to be used.

6. Site Hazards

- Prevent fire or explosion caused by gas or vapours
- Reduce dust by periodically spraying with water
- Take adequate precautions to protect site operatives and the general public from dangerous fumes and dust arising during the course of the Works

3.7 Adjoining Property

- Provide adequate temporary support and protection to adjoining property at each stage.
- Prevent damage to adjoining property and leave no unnecessary or unstable projections
- Do not disturb support to foundations of adjoining property.
- Prevent debris from overloading any part of the structure which is not to be demolished.

3.8 Structure(s) to be retained

- Adequately protect parts of existing structure(s) which are to be kept in place
- Cut away and strip out the minimum necessary
- Prevent debris from overloading any part of the structure which is not to be demolished.

3.9 Partly Demolished Structure(s)

- Leave partly demolished structure(s) in a stable condition, with adequate temporary support at each stage to prevent risk of uncontrolled collapse
- Prevent debris from overloading scaffolding platforms.
- Prevent access of unauthorized persons to partly demolished structure(s). Leave safe outside working hours.

3.10 Asbestos Based Materials

Report immediately any suspected asbestos based materials discovered. Avoid disturbing such materials and observe methods for safe removal.

3.11 Completion

Clear away all debris and leave the site tidy on completion

3.12 Protection

Protect all completed works from damage until the final handing over to client.

3.13 Hardcore

Brick, stone and concrete rubble or other hardcore materials arising from demolition work may be reused as hardcore subject to compliance with the architects instruction..

4. EXCAVATION AND SITE WORKS

4.1. Site Clearance

The building area and its immediate surroundings will be cleared of all rubbish.

Trees and other vegetation to be preserved shall be protected against any damage during the course of construction.

4.2. Levels

The Contractor shall check whether levels indicated are correct and give notice to the Consultant before any excavation.

4.3. Excavations

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All vegetation including roots shall be removed from the building area, which shall then be stripped of topsoil to the depths required.

Topsoil shall be deposited, spread and levelled as directed.

4.4. Preparation for Foundations

Excavations shall be to the depths and widths indicated on the drawings or as directed by the Consultant to give a firm base. No backfilling with excavated material will be allowed for over excavation. Any over excavation, soft spot or loose material encountered during excavation shall be filled with lean mix concrete.

4.5. Kept free from Water

Excavations shall be kept free from water silt and mud.

4.6. Filling

When foundations have been approved by the Consultant, clean laterite from the excavations or other approved hardcore shall be filled in around foundations and to make up levels, carefully rammed and consolidated in layers not exceeding 150mm and with the minimum addition of water. The top layers shall be fine stone, sand or other approved material to receive polythene sheet, as damp proof membrane and/or course (d.p.m/d.p.c), and /or ground floor slab concrete.

4.7. Anti-termite Treatment

Anti-termite soil poisoning shall be CLOROSBAN, diluted at the rate of one part concentrated solution to 40 parts water. Diluted solution shall be applied at the rate of 5 Ltrs per square meter to ground or hardcore over the whole area of the building immediately before (max. 36 hrs) concrete is poured.

4.7 Proportions of Concrete

The concrete mix proportions for each class shall be as given in the table below:-

Class	Cement (kg)	Fine Aggregate (kg)	Coarse Aggregate (kg)	Cube Crushing Strength (N/mm²)
7/40	50	195	300	7
10/10	50	150	125	10

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20/20	50	115	190	20
25/20	50	90	170	25

The quantity of cement must be proportioned by weight, either by weighing at the mixer or by using unbroken 50kg bags, or purpose made gauge boxes for volume batching

8. Mixing Concrete

Materials for concrete shall be measured in approved gauge boxes on a boarded platform. The proportions referred to above are for dry aggregate and due allowance shall be made for the moisture content, to the satisfaction of the Consultant. Materials for concrete shall be mixed by machine and shall be thoroughly mixed together.

The amount of mixing water shall be sufficient to give a good workable mix but in no case shall the slump, as measured in accordance with BS 1881, exceed 50mm. Mixing shall continue until there is a uniform distribution of materials and the mass is uniform in colour and consistency.

Prior to the commencement of any concrete work, the Contractor shall carryout such design and preliminary test procedures as are necessary to determine the most suitable relative proportion of coarse aggregate, fine aggregate, cement and water to produce a concrete which satisfies the requirement of this specification.

No concrete shall be placed in the permanent works until the approval of the Consultant has been given.

9. Work Cube Test

Four 150mm test cubes shall be made on each relevant site for testing in accordance with CP 110 & BS 1881 and also the instructions of the Consultant. A record of the location, date and time of placing concrete in the structure, and of all tests made shall be kept on site. Failure is so regarded if:-

- a. any one single test result is less than the minimum strength specified by greater than 3N/mm²
or
- b. The average of four consecutive test results fails to exceed the specified strength by 3N/mm²

10. Compacting Concrete

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The recommended form of compacting is by poker vibrator.

Concrete may be compacted by hand after approval of Consultant. Concrete shall be deposited in layers of 200mm maximum thickness and be well worked with special tools and rods until the aggregate has settled and concrete is free from air bubbles.

11. Curing of Concrete

Special care shall be taken to avoid concrete drying out too quickly. The exposed faces of newly placed materials shall be immediately protected from sun, wind and rain. All new concrete shall be kept moist by means approved by the Consultant for a curing period of seven full days commencing after the initial setting has taken place.

12. Placing Concrete

Placing of concrete must be planned and executed in such a manner as to avoid cold joints in the works.

All concrete shall be transported and placed as rapidly as possible after mixing and in all cases within thirty minutes, by approved means, to prevent segregation and loss of ingredients. Mixing shall be carried out within 25 meters of the building.

13. Construction Joints

Construction joints shall be arranged in approved positions. Before any new concrete is placed on old, all excess water, laitance etc., shall be removed from the surface of the joint. The surface shall then be well roughened, cleaned and thoroughly wetted immediately before the next placing.

14. Form Work

The design and construction for form-work is to be in accordance with CP110 clauses 6.11.3.1. All form-work shall be rough sawn to provide a suitable key for rendering except exposed concrete faces to the edges of slabs and precast cells which shall be required smooth fair faced from a planned or steel board.

The form-work shall be sufficiently tight to prevent loss of liquid from the concrete and sufficiently stable to preserve the concrete from damage and distortion during setting. The Contractor shall treat the inside of the form-work with an approved lubricant which should avoid contact with reinforcement.

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The formwork and the time, which shall elapse before striking, shall be according to the table below:-

Type of Formwork	Minimum period before Striking
Side of beams, walls, columns	3 days
Slabs (props left under)	4 days
Removal of props to slabs	14 days
Beams soffits (props lefts under)	8 days
Removal of props to beams	21 days

15. Reinforcement

The condition of the reinforcement should be view (clean and free from rust and loose mild scale).

Reinforcement shall be properly lapped and fixed in position to form a rigid case. Rods shall be secured at laps and intersections with binding wire or other approved means.

16. Concrete Cover

Concrete cover to rod reinforcement shall be:-

Foundation	-	40mm
Columns	-	25mm
Beams	-	25mm
Slabs	-	25mm

5. MASONRY

1. Blocks

Materials for block-work shall be as specified under concrete work.

Blocks shall be produced of cement/sand/earth (1:2:6 mix) compressed stabilized earth blocks in an approved method.

The compressive strength shall not less than 4 – 7N/mm² gross area on average of twelve blocks for CSEBs after 30 days. The Contractor shall ascertain the mix necessary to attain

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the required strength, ensure that the blocks meet all the requirements and provide sample blocks from each delivery or batch made to be tested on site or laboratory by the Consultant.

Curing of blocks should be under shade and shielded against drying from direct sunlight. Blocks shall be kept moist on a daily basis for at least three weeks before incorporating into the works.

The size to be used is 290x140x90mm for walls (Compressed Stabilized Earth Blocks - CSEB) with 5% optimum stabilization.

2. Mortar

The proportions for mortar constituents shall be 1:2:6 cement/sand/earth mix by volume

Block work shall be built in 90mm for CSEB vertical courses in stretcher bonds, uniformly true to line and level.

No vertical joint shall be within less than 100mm of another in course immediately above or below. Alternate courses shall be carried through to full thickness of adjoining walls at angles and intersections.

Block work shall be well wetted immediately before being laid, where left off the top of walling shall be wetted before work is recommenced.

Walls shall be carried up evenly and no part of the block work shall be raised more than 800mm above another at any one time. Columns shall always be carried up first and kept at least two courses above the surrounding block work. Any wall left at different levels is to be raked back.

3. Joints

Joints shall be 10mm thick vertically, 10mm thick horizontally and shall be completely filled with mortar. All block work to be rendered shall have horizontal joints raked out 10mm to form a key.

4. Holes and Chases

Holes and Chases required in walling shall be carefully set out and cut to the minimum necessary. Holes and Chases shall be carefully closed flush prior to the application of wall finish.

5. Block Filling

Blocks to be filled shall be laid with the open voids upper most at the following locations the voids adjacent shall be filled with concrete class 10/10

- Abutting a concrete column
- Below a lintel bearing
- Below a sill
- At a lamb

6. CLADDING / COVERING

1. Corrugated Iron Sheeting

Roofing sheets will be `single Span`, Aluzinc Profile Sheets with a thickness of 0.40mm, and a profile height of at least 22mm.

Sheeting shall be laid and fixed in accordance with the manufacturer's printed instructions or as directed by the Consultant. Side laps shall be of not less than one corrugation and shall be turned away from the prevailing wind.

2. Accessories

Accessories will suit the profile of the cladding. Ridge capping will be in lengths not less than 1.8m, and shall be lapped at least 150mm at ends. Fixing shall be in accordance with the manufacturer's printed instruction.

3. Protect the Works

Ladders or crawl boards shall be used to avoid any walking on the sheets and rolls of the felt. The Contractor is to case up, cover and adequately protect all roofing work and deliver the roof in a sound and clean condition.

7. STRUCTURAL / CARCASSING METAL/TIMBER

1. Roof Trusses

Trusses will be square hollow cored steel trussed rafters to dimensions and details as determined by Consultant. The rafters should be truly aligned; the purlins shall be fixed with nails / screws as needed.

2. Generally

All steel is to comply with the general requirements of BS 4360

Unless otherwise specified fastenings to be of the same metal as the item being fixed with a matching coating or finish.

Bolts, screws and nuts to BS 4190. All bolts, screws and nuts to be galvanized. after tightening at least one thread shall show outside the nut.

Self-tapping: work to be from warping, buckling and fractures. Form bends with a brake press or by cold rolling.

Cold formed: work to be free from warping, buckling and fractures. Form bends with a brake press or by cold rolling.

Corners: unless specified otherwise, mitre junctions of identical sections.

Holes: form without distortion of surrounding metal.

Cleaning: remove all burrs and sharp arises, which would be visible after fixing or a hazard to the user.

3. Welding

Preparation: remove dirt, grease, moisture and oxide from edges to be welded. Remove scale and residue from arc and powder cutting by machining or hand grinding.

Accuracy:

- Ensure accurate fit using clamps and jigs where practical
- Use tack welds for temporary attachment where jigging is not practical

Tack welding: use only for temporary attachments unless otherwise specified.

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Welds: Make joints with parent and weld metal fully fused throughout with no inclusions, holes porosity or cracks.

Spatter: prevent weld spatter falling on surfaces of material which will be self-finished and visible in completed work.

Residues: ensure complete removal of flux residues and slag.

Butt welds: which will be visible in completed work to be finished smooth, flush with adjacent surfaces? Hollow sections are not to be flattened for jointing.

Welding of steel: to be one of the following:-

1. Metal arc welding to BS 5135 for mild steel
2. Projection welding to BS 2630
3. Seam welding to BS 6265 for mild steel sheets
4. Other methods subject to approval

4. Doors

The steel doors shall be fabricated or obtained from an approved or nominated manufacturer and shall be of sizes and sections specified on the Drawings. Steel doors shall be manufactured from rectangular hollow sections and flat plates, complete with steel angle frames for fixing to insitu cast concrete fixing blocks with proprietary plastic plugs and metal wedges/packing to details shown on the drawings.

Doors shall be complete with ironmongery including hinges and locks. Locks shall be `Union` type complete with lever handles and shall be screw fixed to the leaf with front plates finished flush with the adjacent steel work. Handles shall be screw fixed or bolted through the leaf.

All locks shall be fitted and where scheduled, shall be grouped into sets and provided with master keys.

5. Fixing Door Frames

The door frames shall be fixed to the block work and the fixing brackets properly embedded and surrounded with concrete. The frames shall be fixed upright square and free from twist and left free from mortar splashing. Handles and stays shall be fixed after painting, hinges oiled and the doors and windows shall be left in good work order.

6. Finishing

Galvanizing to be to BS 729

Protection: prevent distortion of metal work during transit, handling and storage. Prevent damage to arises, projecting features and surfaces which will be exposed in the finished work and prevent contact with mud, ashes, plaster and cement. Retain protective coverings in place for as long as practicable and keep dry.

Place in position and maintain metalwork plumb, level and square.

Loading: metalwork must not carry any structural loads unless specifically designed to do so.

Tightening: do not distort metalwork when tightening

DO NOT WELD, braze or solder on site without approval.

7. Burglar Proofing

Provide burglar metal grillages as given in the Drawings using 10mm high yield steel rod placed at 300mm centre to centre.

8. WOODWORK

1. Materials

All timber is to be best quality obtainable and to the approval of the Consultant, thoroughly seasoned, free from sapwood, large loose or dead knots, waned edges, shakes and all other defects. They shall be treated with `So lignum~ anti-termite solution.

Sawn timbers shall hold to the full sizes specified or noted in the drawings.

MOISTURE CONTENT of timber at time of erection to be not more than 20%

9. ELECTRICAL INSTALLATION

A. Scope of Work

The Electrical installation shall include the supply, installation, commissioning and testing of the whole of the electrical Engineering services described below and shown in Drawings:-

- Internal and external lighting installation
- General purpose power outlet system
- Provision and installation of all sub-main cables, switches, distribution and control equipment
- Provisions and installation of earth rod and associated bonding

B. Regulations

The whole of the electrical installation shall be carried out strictly in accordance with the following:

- The regulations for Electrical Equipment of buildings 14th Edition incorporating reprints and latest amendments issued by Institution of Electrical Engineers.
- The regulations and conditions of the Gambia National Water and Electricity Company (NAWEC)
- Statutory requirements of the Government of the Gambia

C. Consumer Control Unit

Consumer unit shall be a combination of main switch and distribution fuse board to BS 1454. The units shall be tropically rated metal clad TP and N combined switch and breaker unit of surface pattern with earth bonding bar and terminal fitted with shell clam washers controller by a double pole switch.

Switches shall be 100mm x 100 miles amp current operated trip earth leakage circuit breakers to BS 3871. The enclosures shall be at high level. The necessary number of ways shall be provided for 5 amp and 13 amp circuits with an additional two spare ways with blank covers.

D. Cable

Shall be PVC insulated to BS 6004: 1975 of 450, 750 volt grade 2.5m² for power socket circuits and 16mm² between service outlets and Consumer Unit with earth continuity conductor cables throughout.

E. Conduits

Conduit and conduit fittings shall comply with BS 6099 and shall be in white high-impact PVC of a diameter not less than 200mm for use with standard draw-in boxes and fittings.

Conduit shall be concealed in wall chases, floor screeds and in ceiling voids and as a surface system where walls are un-plastered, floor unscreened and ceiling left unlined.

F. Lighting Installation

From the distribution Boards single core cable enclosed in conduit shall be installed to serve the lighting outlets and switches, fans and regulators on a loop-in principle run generally in the slab/ceiling void.

Switches shall be 'MK Logic' series or similar complete with plastic moulded boxes.

LED light fittings shall be single tube fittings 1.20 x 60 Watts with warm white tubes bi-pin caps fixed to so fits of suspended ceilings.

G. Power Installation

The distribution board single core PVC insulated cables enclosed in conduit shall be installed as a concealed or surface system to serve the socket outlet points indicated on the drawing on a ring system. 13 amp switched socket outlet shall be MK 'logic' series or similar complete with metal boxes and ivory insulated cover plates in one or two gang assemblies for mounting as indicated on the drawing.

F. Earth Installation

A main earthing system is to be provided in a position clear of each building and connected to the consumer unit earth terminal by a 6mm² green PVC insulated cable. KA copper red earth terminal is driven into the ground to a minimum length of 2400mm and protected by an earth box of internal size 300 x 300mm precast concrete cover slab with the letter 'E' marked in its upper surface.

I. Testing

The following tests shall be applied by the Contractor to the installation in the manner set out in the relevant section of the IEE Regulations: (14th Edition).

- a. Insulated Resistance Tests

- b. Continuity Tests
- c. Polarity Tests
- d. Ring Circuit Continuity Test
- e. Earth Pole Resistance Test
- f. Earth Impedance Test

10. Materials Generally

Cement and water shall be as described in the concrete work section of this specification.

Sand shall be as described in the concrete work section of this specification and it shall be selected.

1. Screeds and Backing

Screeds and backings shall be carried out in mix comprising one part cement; four parts sand gauged by dry volume.

2. Timber

All timber shall comply with the woodwork section of this specification.

3. Wall Tiles

The glazed tiles comply with BS 1281 class 2 type B and shall be of sizes and colours approved by the Employer.

Wall tiles shall be laid using cement mortar. The tiles shall be pointed with white cement grout. All internal and external angles shall be formed in purpose made rounded fittings. The tops of tiling shall be laid in similar tiles unless otherwise.

4. Granolithic Paving

The work shall be carried out in accordance with the requirements of C.P. 204.

The cement aggregate ratio by volume shall be 1:1:2 and a smooth dense surface of satisfactory workability shall be obtained with basalt chip aggregates. The water content of the mix shall be the minimum necessary to permit spreading and compaction.

The flooring 50mm thick shall be laid in two courses of which the upper course shall be at least 20mm thick. The lower course shall be thoroughly compacted prior to laying the

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upper course and the upper courses follow on before initial setting of the lower course in complete.

The upper surface of the flooring shall be brought to a smooth, level and even surface, having no depression exceeding 3mm in any 3 meters and finished with a steel trowel. Second and third trowelling shall be carried out when the granolithic is in a suitable condition.

All surfaces shall be clean and dry before treatment, and the first dressing applied immediately after curing is completed.

5. Ceramic Tiles Flooring

Shall comply with BS 1286 class 2 type B. Tiles shall be bedded by the cement/sand (1:4) semi-dry thick bed method. The bed shall be laid direct on the concrete base and the tiles tamped into 3mm slurry spread on the bed.

Unless otherwise stated elsewhere the tiles shall be laid in uniform pattern with straight joints.

6. Workmanship Rendering

Rendering shall be applied by manual means. The rendered surface shall be plumb and true to within 2mm in any distance of 3 meters.

The thickness of two coat external works, exclusive of keys etc. shall be 24mm both coats being 12mm thick,

With the top coat finished by polishing hard and smooth with a steel trowel with added water as required until set.

The first coat of two coat renders shall be well scored to provide a key for the top coat.

7. Workmanship – Cement and Sand Screed and Backing

The water content of the mixes shall be the minimum necessary to permit spreading and compaction. Slabs shall be maintained touch wet for a 24 hour period to laying screeds and immediately before laying any screeding any free water shall be brushed off and cement/sand slurry (1:1) shall be well brushed to the surface and the screen shall be applied to the wet slurry.

Screeds shall be finished smooth generally with a steel float.

Screeds shall be laid in bays not exceeding 15m² in area, with no side exceeding

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4 meters in length; the bays shall be laid alternatively or staggered and the fill-in bays shall not be laid until the alternative bays have hardened. Joints to bays shall not coincide with any joints in the sub-floor.

8. Protection of floor Finishes and Paving

All floor finishes and paving shall be covered up and protected during the course of the works and thoroughly cleaned of the left sound and true to level upon completion.

Screeds shall be cured as for concrete – specification.

Screeds are to be kept dry for a minimum period of 14 days before the commencement of any follow on painting works.

Screeds are generally for paint finishing as specification for Painting and Decorating.

9. Rendering

Shall be carried out using a mixture of one part cement; four (4) parts of sand gauged by volume.

Renderings shall be in single coat work and as described in the workmanship section of this section for internal work and two coats for external work.

11. Ceilings

Ceiling shall be 6 mm plywood supported to timber bracing with intermediate ceiling joints spanning to external walls with noggins from the purlins.

Plywood shall be fixed using full sheets in both directions (or as stated in measured works) and shall be centred to form full sheet equal margins to and at no time less than 300mm.

Timber cover beads with 10mm chamfered edges shall be fixed to all plywood junctions. Junctions to cover beads shall be mitred to corners and cut to suit the timber profile at all square meters. Cornice beads shall be chamfered to the one free edge only. Cover beads shall be nail fixed with oval nails through ceiling boards to bracing support. All nails are to be punched and holes filled before painting.

12. Approvals

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Before decoration commences, all rendering shall be approved by the Engineer/Consultant and any hollow areas, cracks, blisters or other defects shall be cut out and made good at the Contractor's expense.

9. Sample panel

A sample panel of any finishing shall be prepared and approved if directed. The finishing shall not vary in colour or quality from the approved sample.

13. PAINTING

1 Materials

All materials shall comply with the appropriate British standard and BS Code of Practice CP 231 and shall be of best quality and from approved manufacturers.

Colours of paints shall be as directed by Engineer and the Contractor shall provide, if required and at his own expense, sample panels of paintwork showing the respective tints selected for the work.

Woodwork and steelwork that requires priming shall be coated with approved priming paint.

Block work and concrete surfaces internally that require painting shall be given on coat of ``Plastron`` or other equal and approved primer.

Paint is to be of the acrylic paint type and is to be applied in two coats (after priming) externally, to block work on concrete surfaces.

Gloss paint is to be external quality full gloss alkyd resin type and to be applied in on coat (after on undercoat) both externally and internally, to all wood and metal work, where specified.

The varnish and cellulose are to be obtained from an approved manufacturer and varnish, whether for internal or external application shall be of external quality. The varnish and cellulose shall be applied in two coats and sufficient care shall be taken to ensure a dust free hard surface on completion.

2. Workmanship Generally

All surfaces to be painted shall be properly prepared according to approved practice and if painting of exterior work is to be done during the wet weather or upon surfaces that are not thoroughly dry.

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All painting work shall be done according to good practice, and each coat shall be allowed to become hard dry before the application of the next coat.

3. Painting Iron and Mild Steel

Surface shall be thoroughly cleaned down to remove all dirt, grease etc. thoroughly scraped and wire-brushed to remove all rust and loose scale back to bright metal. The surfaces shall be primed immediately with one coat of red lead primer to BS 2521/2523. After the priming apply two coats undercoat and one coat gloss.

4. Painting Concrete Block work

Surfaces shall be allowed to dry out completely. Any efflorescence shall be removed. When the surfaces are dry they shall be treated with one coat matt emulsion applied as a mist coat, then two coats silk one coat matt emulsion for interior work. A mist coat shall be mixture of ½ paint / 1/2 clean water.

For exterior surface work treat with one coat multipurpose primer (off-white) and two coats masonry paint.

5. Painting Wood Work

All hardwoods shall be finished smooth with a fine glass paper. Round off any sharp arises and remove dry grease or other marks with fine glass paper as required.

After fabrication overfill all nail holes etc. with poly-filler exterior grade and rub down to smooth finish after setting up.

Apply one coat wood primer, two coats undercoat and one coat between coats only with a fine glass paper

6. Varnishing Woodwork

All hardwoods for varnishing shall be finished with fine glass paper. Round off any sharp arises and remove dry grease or other marks with a fine glass paper as required.