

DESIGN AND BUILD/CONSTRUCTION OF AN ACTIVE AGEING CENTRE (AAC) AT AN UNOCCUPIED VOID DECK FOR STROKE SUPPORT STATION (S3)

MATERIAL AND WORKMANSHIP SPECIFICATIONS

1. GENERAL

- a. This Specification is for works to be done, items to be supplied and used in the works as shown and defined in the Design Proposal, Drawings and described herein, to the satisfaction of S3
- b. The workmanship in all aspects of work is to be the best available and of a quality standard by specialist or tradesmen.
- c. Samples of all materials are to be submitted to S3 for approval before the vendor orders or delivers in bulk to the site. Samples in their packaging are to be provided free of charge by the vendor, and should any materials be rejected, they will be removed from the site at the vendor's expense. All samples will be retained as site control samples. Also, the vendor will be required to submit specimen finishes of colours, fabrics, etc., for approval of S3 before proceeding with the works. Should it be necessary to prepare shop drawings, such drawings shall be submitted for S3's approval at the vendor's expense.
- d. The vendor shall take all measurements for joinery work at the site and not from the drawings.
- e. Where in the opinion of S3, any of the finished works, materials or workmanship in any part of the works fail to comply with the specification, that part of the works will not be accepted and shall be classified as defective. All works classified as defective shall be removed from the works and replaced or otherwise dealt with in a manner as approved by S3.

2. DESIGN RESPONSIBILITY

- a. This is a design and build project. The drawings and specifications provided herein and Part 1 – ITT Cover indicate the general scope, design and performance requirements, basic dimensions and profiles.
- b. The vendor shall be responsible for the work works including the design, structural, calculations, shop drawings, material fabrication and installation, guarantees and/or warranties, related documentation and certification where necessary.
- c. The vendor shall be responsible for the water-tightness, air-tightness, structural integrity and the overall performance of the works.
- d. The vendor shall furnish and install all items including the supplementary parts required for the proper completion of the works.

3. SUBMISSION AFTER AWARD OF QUOTATION

- a. The vendor shall submit a detailed programme schedule for the works in compliance with the contract for S3's approval. The schedule shall commence from the date of Letter of Acceptance and highlight the periods for preliminary preparation, submission of samples/mock-up, deliveries, installation, site testing and commissioning, and operational training, etc. The vendor shall execute and complete the works according to the approved programme schedule.
- b. The vendor shall submit samples and associated installation materials together with colour charts, manufacturer's specifications and installation instructions for S3's approval before proceeding to order or deliver in bulk to the site. Approved samples will be retained as site control samples. Any materials which are not in accordance to the approved samples shall be removed and replaced at the vendor's expense.
- c. The vendor shall submit fully dimensioned detailed shop drawings with plans, elevations, sections, material, finishes and colours for S3's review and approval before fabrication.

4. STANDARDS

- a. All materials and workmanship shall be in accordance with the latest Singapore Standards or equivalent standards.
- b. All materials must conform to the latest fire safety code or equivalent requirements.

5. MATERIALS

- a. Unless otherwise described, the description of each item of measured work shall include for supplying and delivering of all materials, unloading, sorting, selecting, storing, carriage and cartage, cutting and all waste on materials, hoisting, all labour setting, fitting and fixing in position, covering up and protecting finished work, clearing away all debris and waste, return of packing, carriage paid, use of plant and equipment, supervision, establishment and overhead charges, profit and all other labour and materials necessary for the due and proper execution of each item.

6. DRYWALL PARTITION

- a. Drywall partition, whether full height or half glazed, shall be constructed of galvanized steel stud framing and with fiberglass / rockwool insulation cladded both sides with gypsum plaster board lining.
- b. All drywalls shall be impact resistant and comply with BS 5234 (Partition: Specification for performance requirements for strength and robustness including methods of test).
- c. Fire-rated walls shall be tested in accordance to BS 476 (Fire test to building materials and structures).
- d. Where installed at wet areas, the walls shall be water resistance through core and mould resistance.

7. GLAZING

- a. All full-height fixed glass wall partitions shall be of frameless tempered glass with concealed framing supports unless otherwise stated.
- b. All glass shall be of approved manufacture complying with BS 952 or equivalent and free from specks, air bubbles, wanes, scratches, air hole and other defects.
- c. On completion, clean all glass inside and outside, replace all cracked and broken glass and leave the whole work in good condition.

8. FLOOR, WALL & CEILING FINISHES

a. Ceramic Tiling

- i. The vendor is required to provide local testing and report for the tiles to meet compliance for SS 483 (Specifications for ceramic tiles), BS EN 14411 (Ceramic Tiles) or approved equivalent.
- ii. The colours of the grout shall complement the tiles. The vendor shall submit the standard colour chart for selection prior to the works. Tile joints shall not exceed 3mm thick.
- iii. Unless otherwise specified, all homogeneous tiles shall be mitre joined at L-angled edges.
- iv. The ceramic tile surfaces shall be cleaned and polished thoroughly upon completion.

b. Floor Screeding

- i. The finished floor surfaces shall be true and even over the entire areas to within 3mm when tested with a 3000mm straight edge, and the rate of departure shall not be greater than 1.5mm for each 500mm in distance from any point of contact along the straight edge.
- ii. The vendor shall ensure proper adhesion between the screeds and structure. Any loose or defective materials on structural slab must be removed before screeding. A proper key must be achieved between the screed and the structure.

c. Carpet

- i. The carpets shall be approximately 600mm x 600mm modular carpet tiles unless otherwise stated.
- ii. The carpets shall comply with BS 1006 (Colour fastness of textile and leather) and BS 4790 (Method for determination of the effects of a small source of ignition on textile floor coverings) or approved equivalent. Carpets shall be mothproof and of low VOC emissions.
- iii. Carpets of similar type and batch shall be consistent in colour and appearance.

d. Vinyl Sheeting Flooring

- i. The vinyl sheet shall be biostatic type with low VOC emissions and laid on the floor with approved proprietary adhesive strictly in accordance with the manufacturer's instruction.
- ii. Minimum 75mm high PVC skirting in matching colour and finishing shall be provided.

e. Raised Floor System

- i. The raised floor shall be minimum 150mm finished height access flooring system with cementitious infilled steel panels, anti-static high pressure laminate finish, metal ramp with black anti-skid rubber matting and aluminum skirting and fascia, unless otherwise stated.
- ii. The raised floor system shall pass the "Non-combustible Test for Building Material" under BS 476 Part 4 with valid Certificate of Conformity under PSB Product List Scheme. The raised floor system shall meet the requirements of Fire Safety and Shelter Department (FSSD) or any other regulatory authority.
- iii. The raised floor system shall consist of approximately 600mm x 600mm interchangeable square panels supported by adjustable pedestal assemblies which positively locate, engage and secure panels, and accommodate horizontal grid members.
- iv. The installed floor system shall have a maximum electrical resistance of 10 ohms when measured from the top of the panels, less surface covering to the pedestal base.

- v. The raised floor system shall be capable of supporting a minimum concentrated load of 3.5 kN and a minimum uniform load of 9 kN/m².
- vi. The vendor shall ensure that the space between raised floor and floor slab is clean and free from debris for handover. The floor panels shall be protected against rust and corrosion.
- vii. The vendor shall provide flushed floor socket outlet boxes with access covers in matching floor finish or grommets, where specified, to accommodate power, data and communication wiring.

f. Wall Covering

- i. Wall covering shall carry minimum Class I fire-rating and certified for low VOC emissions.
- ii. Surfaces of substrate shall be prepared dry, including repair and making good if required and sized with a fungicide adhesive to wall covering manufacturer's recommendation prior to actual installation.
- iii. When complete, coverings must be free from air bubbles or pockets, wrinkles, gaps, tears, adhesive marks and stains, and well adhered to its substrate.

g. Painting

- i. All paints shall be fungus resistant, washable and scrubbable with Class A fire rating and does not give off noxious fumes during combustion.
- ii. Paint shall be uniform and consistent in colour after application, in respective of the background substrate. They shall be free from runs, sags and excessive tactile texture.
- iii. All surfaces of the painted work, either priming or finishing paint shall be protected. Damage primed or painted surfaces shall be re-treated and re-painted to the satisfaction of S3. All adjacent surfaces are to be adequately protected and properly masked prior to application of paint.

h. Gypsum Plaster Board Suspended Ceiling System

- i. Gypsum plasterboard shall comply with the latest BS EN 13964 – Suspended Ceilings – Requirements and Methods or approved equivalent.
- ii. The supporting frame should not be continuous over a long span; the span should not be more than 12m. Deflection between the supports of any part of the suspended ceiling shall not exceed $L/360$.

i. Acoustic Mineral Fibre Board Suspended Ceiling System

- i. The mineral fibre board shall be able to achieve the minimum Noise Reduction Coefficient of 0.50 and minimum Ceiling Attenuation Class of 35dB, while the Light Reflectance shall be Class LR1 with a minimum rating of 0.80. The ceiling board shall have low VOC emissions.
- ii. The ceiling shall pass the “Non-combustible Test for Building Material” under BS476 Part 4 with valid Certificate of Conformity under PSB Product List Scheme.

9. CARPENTRY & JOINERY

a. Workmanship

- i. The vendor shall ensure that all work is true and square and that surfaces of wall or ceiling framing to receive linings are in true and even plane. Work shall be accurately set out, framed together and securely fixed.
- ii. Care should be exercised by careful screening for a reasonably uniform appearance and to avoid any strong contrast in colour and graining of all finished or stained surfaces.
- iii. All joinery work shall be wrought and exposed surfaces finished smooth with sandpaper. Arises shall be pencil rounded. All work shall be properly mortised, tenoned, shouldered, housed, dovetailed, mitred, glued, pinned and nailed.
- iv. Skirting and other joinery works shall be accurately scribed to fit the contour of any irregular surface against which they are required to form a close butt connection.

b. Timber

- i. All timber shall be properly seasoned, straight timber, sawn, die square, dry perfectly, free from sap, shakes, waney edges, large loose or dead knots and any other defects.
- ii. Plywood shall be sound and free from warping and twisting.
- iii. Hardwood for joinery works shall be selected so that timber in adjacent pieces is matching or uniform and symmetrical in colour or grain and left clear to receive staining or vanishing.

c. Plastic Laminate

- i. Plastic laminate shall be abrasion resistant, cigarette proof and synthetic resin bonded and comply with BS 3794 or approved equivalent. The sheeting shall be sealed to surfaces with patent adhesive evenly and strictly in accordance with the manufacturer's instructions.
- ii. Upon fixing, exposed edges shall be planed and left with a smooth beveled edge. Laminates used for table-tops shall be flushed with edgings or post-formed.
- iii. Laminate joints should be minimal. Where fixture size exceeds size of plastic laminate, joints shall be in the least conspicuous corners and be equally distributed where joints occur in series to S3's approval. Laminates applied adjacent to each other on the same surface should be of the same thickness.
- iv. Wood grain pattern laminate shall be applied in the direction as indicated in the drawings and care should be taken to match grains as much as possible.

d. Solid Composite Surfacing Material

- i. Solid surfacing material shall be homogeneous, non-porous, and easy to maintain. Material should be durable, colourfast and resistant to impact, stain, scratches, chemical, acids, cigarette burns and algae. It shall be grind smooth at the exposed edges.

e. Doors and Door Frames

- i. Fire-rated doors and frames shall comply with FSSD requirement and delivered to the site tested and labelled or approved equivalent.
- ii. Unless otherwise stated, the doors shall be min. 40mm thick.
- iii. Door frames and jambs shall be square and vertical and to be properly secured in position. They shall provide a neat fitting for doors and be prepared to take hinges and fittings which shall finish flushed.

f. Operable Sliding / Folding Partitions

- i. Operable partitions shall be of acoustic, non-combustible material of quality construction and support to permit ease of operation. Sliding tracks for operable partitions shall be fastened to the structural soffit instead of the false ceiling. Panels should be well aligned and at 90 degrees perpendicular to the floor.

g. Mirrors

- i. Mirrors shall be frameless and of approved silvering quality, electro-copper backed with edges squared or beveled and highly polished, unless otherwise stated.

10. IRONMONGERY

a. Products

- i. All timber doors shall be installed with door closers suitable for the size and weight of the doors, unless otherwise stated. Door closers shall be installed with parallel arm bracket or slide arm and channel method, to be approved by S3 prior to installation.
- ii. All glass doors shall be installed with stainless steel door handles, patch fittings, door closers and hold-open devices.
- iii. All ironmongery shall be installed by the vendor, who shall be responsible for liaising with the manufacturer as to the suitability and right application of all

ironmongery or any other adjustment requiring specialist technical instructions.

- iv. Screws for door furniture shall generally be countersunk-head wood or metal thread screws. Under no circumstances shall steel screws be used.
- v. Vendor to inspect and adjust all locks and door closers and/ or items requiring adjustment and to ensure they operate smoothly.

b. Master Key System

- i. All keys shall be labelled before they are handed over to S3. Master and sub-master keys shall be handed over in the original factory sealed packing.
- ii. All cylinders installed by the vendor shall be provided under the existing Master Key system. Three (3) keys shall be submitted to S3 for each cylinder.

11. WINDOW COVERINGS

a. Roller Blinds

- i. Fabric for roller blinds shall be min. 0.3mm thick polyester fabric or equivalent at min. 260 gm/m². The colour fastness to light shall be min. level 6 in accordance with ISO 105 B02 or equivalent. Unless otherwise stated, the backing of the blinds shall be 100% blackout against the sunlight and scratch-resistant. Gaps between the blinds shall be max 25mm.
- ii. Fire retardant standards of the blinds shall comply with NFPA 701 or equivalent.
- iii. Roller blinds shall be manually operated unless otherwise stated. The drive system shall be of hand-drive via plastic pull chain. The blind shall be able to park at any position without the necessity to secure the pull chain.
- iv. Where motorised blinds are specified, they shall be switch controlled.
- v. The bottom tube shall be of flat bar design.

b. Solar Film for Windows

- i. The solar film shall comply with the following specifications:
 - Visible light transmission : 40% - 70%
 - Ultra-violet rejection : 95% - 100%
 - Infra-red rejection : 95% - 100%
 - Total solar energy rejection : 50% - 80%

12. AIR-CONDITIONING & MECHANICAL VENTILATION SYSTEMS

a. Sheet Metal Ductwork

- i. All ductworks shall be constructed of best quality galvanised iron sheet of approved manufacture unless otherwise indicated and shall conform to Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) requirements or approved equivalent.
- ii. All ductworks shall be rigidly constructed and braced to prevent "panelling" due to air flow.
- iii. All sheet metal ducts shall be cross broken in sizes above 600mm or else fabricated from sheets 2 gauges or heavier. Cross breaks will be permitted only between adjacent stiffeners.
- iv. Longitudinal joints shall be made with grooved, Pittsburgh or double row riveted and soldered. Circumferential joints shall be as specified and additional flanged joints shall be riveted and soldered, pop rivets may be used in ducts of 600mm or smaller.
- v. At all flanged connections, the angles shall be riveted to ducts at not more than 65mm centres with mastic material between angles and the sheet metal. The flanges shall be spray-painted with one coat of primer and coat of anticorrosive paint before they are bolted together. Angles in flanges shall be welded at the corners.
- vi. Changes in direction shall be made with elbows with an inside radius equal to the width of the duct where possible. Where the space does not permit, sharper or right-angled bends with an inside radius of not less than the duct width may be used with double thickness aerofoil turning vanes. The turning vanes shall have a flange covering the whole base and riveted to the duct at not more than 75mm intervals. Insecurely fitted turning vanes will be rejected.

All changes in dimensions and shape of ducts shall be done in a gradual manner and to S3's approval.

- vii. Ductwork shall be free from waves or buckles and the sheet metal is to be machine-bent to ensure neat and accurate fabrication. Where double thickness aerofoil shape internal stiffeners are fitted, the original cross-sectional area of the duct shall be maintained.
- viii. Full sized standard sheets of the gauges shall be used and any patched or made-up pieces of ductwork will be rejected. Joints between flanged connections shall be fitted with asbestos rope gaskets of 3 mm thick.
- ix. All ductwork which are not insulated shall be painted externally.

b. Duct Insulation

- i. All air-conditioning ducts below the roof shall be insulated with 25 mm thick 32 kg/m³ resin bonded fibreglass with a thermal conductivity of not more than 0.028 kcal/m/hr/°C at 24°C mean temperature. The vapour barrier shall consist of heavy-duty fire retardant double-sided reflective aluminium foil.
- ii. The complete surface of duct and insulation material shall be coated with adhesive before pressing together. Insulation shall be carried over all flexible connections and points subject to condensation. For ductwork over 2400 mm in width, 1.5 mm thick angles of 75 mm x 75 mm x 150 mm long shall be provided on all corners at 1200 mm centres and fixed by a circumferential strapping band of 15 mm minimum width, tight drawn and securely fastened to prevent any sagging of duct insulation. The aluminium foil vapour seal shall have an overlap of 75 mm minimum at all joints and securely cemented to ensure a thoroughly effective vapour seal. Particular care shall be exercised to ensure that the vapour seal is complete.
- iii. Care shall be exercised at the hangers to ensure that the vapour seal is continuous. Additional patches shall be neatly glued over any damaged section of the vapour seal and penetrations by hangers and supports.
- iv. The ends of joints in the insulation shall be coated with adhesive and cemented together to ensure continuity of the insulation.
- v. Duct joints and seams shall be made airtight by use of sealants acceptable to local authority. Test points shall be provided at the discharge of each air

handling unit and at each individual zone of the ductwork system. Test points shall consist of 25 mm diameter sockets fitted with sealing plugs which can be removed for the fitting of measuring devices. Test points shall be insulated for the ductwork and provided with identification labels.

13. ELECTRICAL POWER & LIGHTING SERVICES

a. General

- i. The vendor shall be responsible for the application of necessary permits including upgrading, testing and commissioning of the Electrical Installation by the relevant Authority including payment of the necessary fees.
- ii. The vendor shall be responsible for the design, supply, installation, testing and commissioning of all electrical wiring, fittings and accessories mounted onto the custom-made furniture. These include power points, switches, lighting fixtures, dimmers and etc. All wiring conduits are to be properly housed and concealed.
- iii. The vendor shall be responsible for drawing and pulling of wires from the existing electrical points including additional length of cables, where required.
- iv. All electrical wirings shall be concealed, where possible.
- v. All electrical fittings and accessories including socket outlets, switches and etc. shall be of matching brand and design.

b. Lighting

- i. All fluorescent lighting and LED lighting luminaries shall comply with BCA requirements.
- ii. Where applicable, the end-to-end length of the concealed fluorescent/LED lamps shall be installed to overlap each other slightly.
- iii. PL downlights, where provided, shall be equipped with anti-glare reflector.
- iv. Changes to light zoning and switching arrangements shall be provided without any additional cost.

- v. All lights and dimmer switches shall be installed at 800mm to 1200mm from floor in compliance with BCA requirements and all power points shall be at 300mm from floor unless otherwise stated.

14. FIRE PROTECTION SYSTEMS

a. Sprinklers

- i. The vendor is responsible for the entire installation of the automatic fire sprinkler system in accordance with the latest SS CP 52 and FSSD's requirements.
- ii. Sprinklers shall be of approved makes and listed by approved Institutions such as Factory Mutual (FM), Underwriters Laboratories (UL), Loss Prevention Council (LPC), etc. Sprinklers shall be conventional pattern designed to produce a spherical type of discharge with a proportion of water being thrown upwards to the ceiling. Sidewall pattern type shall be used where appropriate. Sprinklers shall be designed with universal type deflector enabling the sprinkler to be erected in either the upright or pendant position.
- iii. For sprinkler heads and pipework installed inside the false ceiling space to protect the concealed spaces, the sprinklers shall be of standard bronze finish and installed preferably in the upright position.
- iv. For sprinkler heads installed at the suspended ceiling and protecting the spaces below the ceiling, the sprinklers shall be installed pendant complete with ceiling plate flush to the suspended ceiling. Sprinklers shall be of satin-chromed finish. The vendor shall provide fixed deflectors instead of retracted deflectors. Ceiling plates shall be of steel construction and either chromed or painted.
- v. For exposed sprinkler heads and exposed pipework installation where there is no suspended ceiling, sprinklers shall be installed in the preferably upright position and of satin chromed finished.
- vi. Where sprinkler heads are completely flushed with the suspended ceiling, sprinkler head shall consist of cover plate assembly that conceals the sprinkler operating components above the ceiling. The head-sensitive cover plate, which is normally soldered to the retainer, shall fall away to expose the sprinkler assembly in the event of fire.

- vii. All sprinkler heads, unless otherwise stated, shall have a temperature rating of 30°C above the ambient temperature. Sprinklers in kitchen area, where applicable, shall be rated at 79°C unless otherwise stated. Sprinklers installed in kitchen hoods shall be rated at 141°C.

b. Pipework

- i. All pipes shall be fixed clear of one another and arranged to provide easy access for maintenance and repair.
- ii. Where pipes run in parallel to one another or close to walls, floor slabs, beams, columns, etc., a minimum distance of 50 mm shall be maintained between the surface of the pipe and the nearest surface.

c. Pipe & Fitting Material

- i. The pipe and fitting material shall conform to the following standards and suitable for the working pressure. In any case, they shall be suitable for a working pressure of not less than 14 bars (200 psi).
- ii. Fittings for pipes with 65mm diameter and above shall be of coupling type. All coupling shall be for use in fire protection system, registered with UL/FM and must be approved by Singapore Fire Authority. The coupling shall be rated up to 300psi.
- iii. Pipes above ground must be at least of medium grade black mild steel conforming to BS 1387 - Steel tubes and tubulars for screwing to BS 21 pipe threads unless otherwise specified.
- iv. All positions of D.B. & fire alarm etc. shall be confirmed with S3 prior to actual installation. S3's comments on these shall be on aesthetics only and will not in any way relieve the vendor of his responsibility pertaining to the technical aspects and function of the equipment.