RAPHAEL CONTRACTING LIMITED

Carpentry & Joinery

Specialist Fit Outs

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REQUEST FOR INFORMATION

BALFOUR BEATTY
GRESSE STREET

PACKAGE NO:CARPENTRY
REQUEST NO:003
DATE: 28/04/09

BLOCK/LOCATION:	ALL FLOORS
SUBJECT/DESCRIPTION:	SPECIFICATIONS

QUERY: COULD YOU PLEASE PROVIDE FULL SET OF SPECIFICATIONS FOR THE JOINERY WORKS FOR THE ABOVE CONTRACT

RESPONSE REQUIRED BY:04/05/09

SIGNED
on behalf of RCL D SANDERS

REPLY: SEE ATTACHED

SIGNED
on behalf of BB

DATE: 29/4/09.

DISTRIBUTION: BBCL SITE RCL SITE PLUS HEAD OFFICE

EMAILED TO RCL ON 29/4/09
VB

A13 DESCRIPTION OF THE WORK

To be read with Preliminaries/General Conditions. For description of building envelope works refer to separate building envelope specification.
The work includes but shall not be limited to:

110 DEMOLITIONS (REFER ALSO TO STRUCTURAL ENGINEER'S DOCUMENTATION):
- Demolish all internal walls and partitions above basement level.
- Demolish internal walls and partitions to basement.
- Demolish basement slab.
- Retain the existing basement retaining walls to north, east and southeast sides (N.B. temporary works are to be to the approval of the structural engineer).
- Excavate downwards within existing basement oil tank room.
- Demolish ground floor slab and all upper floor slabs.
- Demolish roofs and external façades.

120 STRUCTURAL WORKS (REFER ALSO TO STRUCTURAL ENGINEER'S DOCUMENTATION):
- New raft foundation to basement with pit for lift.
- New horizontal smoke vent shafts to basement.
- Structural frame comprising reinforced fair faced concrete columns and slabs with reinforced concrete core walls.
- Fair faced insitu concrete stairs to cores.
- Suspended slab to ground floor reception area.

130 SERVICES (REFER ALSO TO SERVICES ENGINEER'S DOCUMENTATION):
- Displacement ventilation system utilising under-floor void as air supply plenum.
- Air extract system to office floors and core toilets.
- Communications and data cabling to landlord areas and tenant risers.
- New passenger lifts and fire fighting lift.
- Gas fired boilers, with water fed radiators to cores.
- New ground floor electrical transformer chamber.
- Electrical supply for landlord's and tenant services.
- Emergency generator for back-up power to life safety systems.
- Lighting installation to landlord's areas and office floors, including specialist feature lighting to reception, and facades.
- Emergency lighting installation to escape routes.
- Sanitary installation to cores.
- Rainwater disposal system.
- Lightning protection system.
- Addressable radio controlled fire alarm and detection system.

140 EXTERNAL WORKS:
- Replace existing paving with new granite slabs.
- Replace existing surface drainage with new slot type drains.
- New trees and tree grilles to Gresse Street / Evelyn Yard site entrance and Hanway Place courtyard.
- Covered cycle store to new Hanway Place courtyard.
- Pavement smoke vent panels and stainless steel demarcation discs.

150 EXTERNAL WALLS:
- Steel doors and louvres to EDF Energy substation.
- Brick enclosure to substation.
- Refer to building envelope specification for other works.

160 INTERNAL WALLS:
- Fair faced / drylined / tiled blockwork walls to basement floor.
- Frameless glass / plasterboard partition and profiled GRP feature wall lining to reception area.
- Plasterboard partitions and drylining to RC core walls on upper floors, with painted MDF wall panels to office side. Full height solid core fire resisting doorsets, with painted MDF cosmetic doors to risers.

170 ARCHITECTURAL METALWORK:
- Steel balustrades to core stairs.
- Steel roof access ladder to 6th floor stair landing.

- Galvanised steel steps and grillage deck to 5th floor chiller compound.
- Air extract grille panels to office floors.
- Aluminium perimeter floor grilles to office floors.
- Steel guardings to fire fighting lobby smoke vent panel.
- Galvanised steel ventilation grillage deck to Hanway Place pavement basement vents.
- Decorative entrance gates to Gresse Street / Evelyn Yard and to Rathbone Place, and decorative gate to Hanway Place side passage (design by artist as part of site artwork).

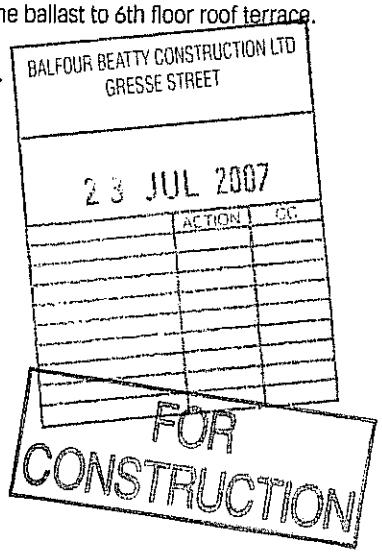
180 FLOORS:
- Raised access floors with supply air diffusers and carpet finish (by tenant) to office floors.
- Stone slab finish to reception area and toilets.
- Sheet rubber finish to cores and basement front of house areas.
- Non-slip vinyl to basement accessible wet room.

190 CEILINGS:
- Fair faced concrete soffit with sprayed plaster finish to office floors with cast in conduit / luminaries or surface mounted lighting track.
- Fair faced concrete soffit with sprayed plaster finish to ground floor reception with cast in conduit / luminaries.
- Painted plasterboard suspended ceiling to core lobbies and basement toilets.
- Back-lit translucent acrylic ceilings to office WCs.

200 ROOF:
- Single ply polymeric membrane with insulation to main area roof.
- Single ply polymeric membrane with insulation over metal roof 4th floor chiller compound.
- Liquid applied waterproof membrane with insulation and concrete pavers / stone ballast to 6th floor roof terrace.
- Double glazed rooflight above 6th floor lift lobby.
- Steel fresh air shaft rooftop enclosure (refer to services engineer's information).
- Roof access hatch and smoke vent to head of 6th floor stairs.

210 FIXTURES AND FITTINGS:
- Bespoke reception desk to reception area.
- Cantilvered glass modesty panels to reception area.
- Tenant directory board to reception area.
- Wayfinding and statutory signage to landlord areas and escape routes.
- Fire extinguisher and dry riser outlet cabinets to cores.
- Vanity units to WCs.

END



A31 PROVISION, CONTENT AND USE OF DOCUMENTS

DEFINITIONS AND INTERPRETATIONS

110 DEFINITIONS: The meaning of terms, derived terms and synonyms used in the preliminaries/general conditions and specification is as defined below or in the appropriate British Standard or British Standard glossary.

120 CA means the person nominated in the Contract as the Architect.

122 EA means the person nominated in the Contract as Employer's Agent or an authorised representative.

130 IN WRITING: When required to advise, notify, inform, instruct, agree, confirm, obtain information, obtain approval or obtain instructions do so in writing.

140 APPROVAL (and words derived therefrom) means the approval in writing of the CA unless specified otherwise.

145 SUBMIT (and words derived therefrom) means to the CA unless otherwise instructed.

150 PRODUCTS means materials (including naturally occurring materials) and goods (including components, equipment and accessories) intended for permanent incorporation in the Works.

180 CROSS-REFERENCES TO THE SPECIFICATION:

- Where a numerical cross-reference to a specification section or clause is given on drawings or in any other document the Contractor must verify its accuracy by checking the remainder of the annotation or item description against the terminology used in the referred to section or clause.
- Where a numerical cross-reference is not given the relevant section(s) and clause(s) of the specification will apply, cross-reference thereto being by means of related terminology.
- Where a cross-reference for a particular type of work, feature, material or product is given, relevant clause(s) elsewhere in the referred to specification section dealing with general matters, ancillary products and workmanship also apply.
- The Contractor must, before proceeding, obtain clarification or instructions in relation to any discrepancy or ambiguity which may be discovered.

200 SUBSTITUTION OF PRODUCTS:

- Where the substitution of a product different to that specified is permitted, before ordering the product inform the CA of the reasons for the substitution. When requested, submit for verification documentary evidence that the alternative product is equivalent in respect of material, safety, reliability, function, compatibility with adjacent construction, availability of compatible accessories and appearance. Submit certified English translations of any foreign language documents.
- Any proposal for use of an alternative product must also include proposals for substitution of compatible accessory products and variation of details as necessary, with evidence of equivalent durability, function and appearance of the construction as a whole.
- If substitution is approved, and before ordering products, provide revised drawings, specification and manufacturer's guarantees.

201 EQUIVALENT PRODUCTS: Wherever products are specified by proprietary name and the phrase 'or equivalent' is not included, it is to be deemed included.

210 SUBSTITUTION OF STANDARDS: Where any product is specified to comply with a British Standard for which there is no equivalent European Standard it may be substituted by a product complying with a grade or category within a national standard of another Member State of the European Community or an international standard recognised in the UK specifying equivalent requirements and assurances in respect of material, safety, reliability, function, compatibility with adjacent construction, availability of compatible accessories and, where relevant, appearance. In advance of ordering submit notification of all such substitutions and, when requested, submit for verification documentary evidence confirming that the products comply with the specified requirements. Any submitted foreign language documents must be accompanied by certified translations into English.

220 CURRENCY OF DOCUMENTS:

- References to standards, type approval certificates, catalogues, codes of practice and the like are to the editions, revisions, versions and amendments current at the time of tender.

- References to BSI documents are to the versions and amendments listed in the BSI Standards Catalogue, including updates, current at the time of tender.

230 MANUFACTURER AND REFERENCE: Where used in this combination:
- 'Manufacturer' means the firm under whose name the particular product is marketed.
- 'Reference' means the proprietary brand name and/or reference by which the particular product is identified.

270 SIZES: Unless otherwise stated:
- Products are specified by their co-ordinating sizes.
- Cross section dimensions of timber shown on drawings are nominal sizes before any required planing.

280 FIX ONLY means all labours in unloading, handling, storing and fixing in position, including use of all plant.

290 SUPPLY AND FIX: Unless stated otherwise all items given in the schedule of work and/or on the drawings are to be supplied and fixed complete.

710 TECHNICAL LITERATURE: The Contractor is required to keep copies of the following on site, readily accessible for reference by all supervisory personnel:
- Manufacturers' current literature relating to all products to be used in the Works.
- Relevant BS Codes of Practice.

720 MAINTENANCE INSTRUCTIONS AND GUARANTEES:
- Retain copies delivered with components and equipment (failing which, obtain), register with manufacturer as necessary and hand over to EA on or before Practical Completion.
- Notify EA of telephone numbers for emergency services by Subcontractors after Completion.

END

FOR CONSTRUCTION

A33 QUALITY STANDARDS/CONTROL

MATERIALS AND WORK GENERALLY

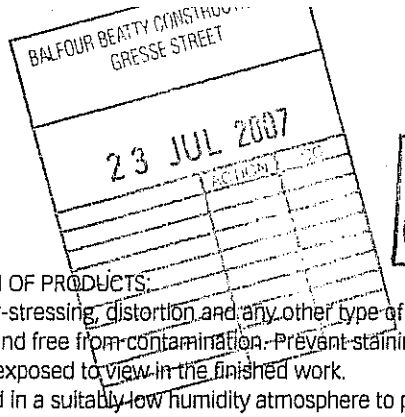
110 GOOD PRACTICE: Where and to the extent that materials, products and workmanship are not fully detailed or specified they are to be:
- Of a standard appropriate to the Works and suitable for the functions stated in or reasonably to be inferred from the project documents, and
- In accordance with relevant good building practice.

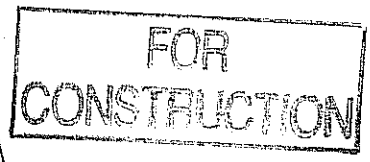
120 GENERAL QUALITY OF PRODUCTS:
- Products to be new unless otherwise specified.
- For products specified to a British or European Standard obtain certificates of compliance from manufacturers when requested by CA.
- Where a choice of manufacturer or source of supply is allowed for any particular product, the whole quantity required to complete the work must be of the same type, manufacture and/or source unless otherwise approved. Produce written evidence of sources of supply when requested by CA.
- Ensure that the whole quantity of each product required to complete the work is of consistent kind, size, quality and overall appearance.
- Where consistency of appearance is desirable ensure consistency of supply from the same source. Unless otherwise approved do not use different colour batches where they can be seen together.
- If products are prone to deterioration or have a limited shelf life, order in suitable quantities to a programme and use in appropriate sequence. Do not use if there are any signs of deterioration, setting or other unsatisfactory condition.

130 PROPRIETARY PRODUCTS:
- Handle, store, prepare and use or fix each product in accordance with its manufacturer's current printed or written recommendations/instructions. Inform CA if these conflict with any other specified requirement. Submit copies to CA when requested.
- Ancillary products and accessories to be of a type recommended by the main product manufacturer, unless otherwise specified.
- The tender will be deemed to be based on the products specified and recommendations on their use as described in the manufacturer's literature current at the date of tender.
- Obtain confirmation from manufacturers that the products specified and recommendations on their use have not been changed since that time. Where such change has occurred, inform CA and do not place orders for or use the affected products without further instructions.
- Where British Board of Agreement certified products are used, comply with the limitations, recommendations and requirements of the relevant valid certificates.

133 TIMBER PROCUREMENT (to be read in conjunction with the most current version of Balfour Beatty Construction Ltd's timber procurement policy)
- Timber (including timber for wood based products): Obtained from well managed forests and/ or plantations in accordance with:
  - Balfour Beatty Construction Ltd's timber procurement policy
  - The laws governing forest management in the producer country or countries.
  - International agreements such as the Convention on International Trade in Endangered Species of wild fauna and flora (CITES).
- Documentation: Provide:
  - Documentary evidence (which has been or can be independently verified) regarding the provenance of all timber supplied, in accordance with Balfour Beatty Construction Ltd's timber procurement policy.

140 CHECKING COMPLIANCE OF PRODUCTS: Check all delivery tickets, labels, identification marks and, where appropriate, the products themselves to ensure that all products comply with the project documents. Where different types of any product are specified, check to ensure that the correct type is being used in each location. In particular, check that:
- The sources, types, qualities, finishes and colours are correct, and match any approved samples.
- All accessories and fixings which should be supplied with the goods have been supplied.
- Sizes and dimensions are correct. Where tolerances of components are critical, measure a sufficient quantity to ensure compliance.
- The delivered quantities are correct, to ensure that shortages do not cause delays in the work.
- The products are clean, undamaged and otherwise in good condition.
- Products which have a limited shelf life are not out of date.





150 PROTECTION OF PRODUCTS:
- Prevent over-stressing, distortion and any other type of physical damage.
- Keep clean and free from contamination. Prevent staining, chipping, scratching or other disfigurement, particularly of products exposed to view in the finished work.
- Keep dry and in a suitably low humidity atmosphere to prevent premature setting, moisture movement and similar defects. Where appropriate store off the ground and allow free air movement around and between stored products.
- Prevent excessively high or low temperatures and rapid changes of temperature in the products.
- Protect adequately from rain, damp, frost, sun and other elements as appropriate. Ensure that products are at a suitable temperature and moisture content at time of use.
- Ensure that sheds and covers are of ample size, in good weatherproof condition and well secured.
- Keep different types and grades of products separately and adequately identified.
- So far as possible keep products in their original wrappings, packings or containers, until immediately before they are used.
- Wherever possible retain protective wrappings after fixing and until shortly before Practical Completion.
- Ensure that protective measures are fully compatible with and not prejudicial to the products/materials.

160 SUITABILITY OF RELATED WORK AND CONDITIONS: Ensure that all trades are provided with necessary details of related types of work. Before starting each new type or section of work, ensure that:
- Previous, related work is appropriately complete, in accordance with the project documents, to a suitable standard and in a suitable condition to receive the new work.
- All necessary preparatory work has been carried out, including provision for services, openings, supports, fixings, damp proofing, priming and sealing.
- The environmental conditions are suitable, particularly that the building is suitably weathertight when internal components, services and finishes are installed.

170 GENERAL QUALITY OF WORKMANSHIP:
- Operatives must be appropriately skilled and experienced for the type and quality of work.
- Take all necessary precautions to prevent damage to the work from frost, rain and other hazards.
- Inspect components and products carefully before fixing or using and reject any which are defective.
- Fix or lay securely, accurately and in alignment.
- Where not specified otherwise, select fixing and jointing methods and types, sizes and spacings of fastenings in compliance with section Z20. Fastenings to comply with relevant British Standards.
- Provide suitable, tight packings at screwed and bolted fixing points to take up tolerances and prevent distortion. Do not overtighten fixings.
- Adjust location and fixing of components and products so that joints which are to be finished with mortar or sealant or otherwise left open to view are even and regular.
- Ensure that all moving parts operate properly and freely. Do not cut, grind or plane prefinished components and products to remedy binding or poor fit without approval.

180 BS 8000: BASIC WORKMANSHIP
- Where compliance with BS 8000 is specified, this is only to the extent that the recommendations therein define the quality of the finished work.
- Where BS 8000 gives recommendations on particular working methods or other matters which are properly within the province and responsibility of the Contractor, compliance therewith will be deemed to be a matter of general industry good practice and not a specific requirement of the CA under the Contract.
- If there is any conflict or discrepancy between the recommendations of BS 8000 on the one hand and the project documents on the other, the latter will prevail.

190 WATER FOR THE WORKS: Clean and uncontaminated. If other than mains supply is proposed provide evidence of suitability, including compliance with BS EN 1008 if necessary.

SAMPLES/APPROVALS

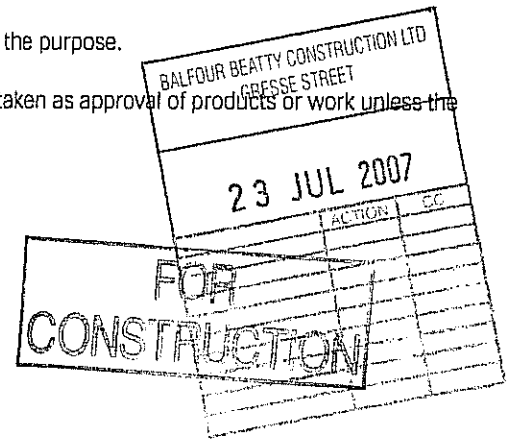
210 APPROVAL OF PRODUCTS: Where approval of a product is specified the requirement for approval relates to a sample of the product and not to the product as used in the Works. Submit a sample or other evidence of suitability. Do not confirm orders or use the product until approval of the sample has been obtained. Retain approved sample in good, clean condition on site. Ensure that the product used in the Works matches the approved sample.

220 SAMPLES OF FINISHED WORK: Where a sample of finished work is specified for approval, the requirement for approval relates to the sample itself (if approval of the finished work as a whole is required this is specified

separately). Obtain approval of the stated characteristic(s) of the sample before proceeding with the Works. Retain approved sample in good, clean condition on site. Ensure that the relevant characteristic(s) of the Works match the approved characteristic(s) of the sample. Remove samples which are not part of the finished Works when no longer required.

230 APPROVALS: Where and to the extent that products or work are specified to be approved or the CA instructs or requires that they are to be approved, the same must be supplied and executed to comply with all other requirements and in respect of the stated or implied characteristics either:
- To the express approval of the CA or
- To match a sample expressly approved by the CA as a standard for the purpose.

240 APPROVALS: Inspection or any other action by the CA must not be taken as approval of products or work unless the CA so confirms in writing in express terms referring to:
- Date of inspection
- Part of the work inspected
- Respects or characteristics which are approved
- Extent and purpose of the approval
- Any associated conditions.



ACCURACY/SETTING OUT GENERALLY

320 SETTING OUT: Submit details of methods and equipment to be used in setting out the Works.

321 SETTING OUT: Check the levels and dimensions of the site against those shown on the drawings, and record the results on a copy of the drawings. Notify CA in writing of any discrepancies and obtain instructions before proceeding.

322 SETTING OUT: Inform CA when overall setting out is complete and before commencing construction.

340 APPEARANCE AND FIT:
- Arrange the setting out, erection, juxtaposition of components and application of finishes (working within the practical limits of the design and the specification) to ensure that there is satisfactory fit at junctions, that there are no practically or visually unacceptable changes in plane, line or level and that the finished work has a true and regular appearance.
- Wherever satisfactory accuracy, fit and/or appearance of the work are likely to be critical or difficult to achieve, obtain approval of proposals or of the appearance of the relevant aspects of the partially finished work as early as possible.
- Without prejudice to the above and unless specified otherwise, tolerances will (where applicable) be not greater than those given in BS 5606, Tables 1 and 2.

361 CRITICAL DIMENSIONS: Certain dimensions on the following drawings are noted as 'critical'; set out and construct the works to ensure compliance with the tolerances stated on the drawings.

370 LEVELS OF STRUCTURAL FLOORS: Maximum tolerances for designed levels to be as follows:
- Floors which are to be self-finished, and floors to receive sheet or tile finishes directly bedded in adhesive: ±10 mm.
- Floors to receive dry board/ panel construction with little or no tolerance on thickness: ±10 mm.
- Floors to receive mastic asphalt flooring/ underlays directly: ±10 mm.
- Floors to receive mastic asphalt flooring/ underlays laid on mastic asphalt levelling coat(s): ±15 mm.
- Floors to receive fully bonded levelling screeds/ wearing screeds/ beds: ±15 mm.
- Floors to receive unbonded or floating screeds/ beds: ±20 mm.

380 RECORD DRAWINGS: Record details of all grid lines, setting-out stations, bench marks and profiles on the site setting-out drawing. Retain on site throughout the contract and hand to EA on Completion.

SERVICES GENERALLY

410 SERVICES REGULATIONS: Any work carried out to or which affects new or existing services must be in accordance with the Bye Laws or Regulations of the relevant Statutory Authority.

420 SERVICE RUNS: Make adequate provision for services, including unobstructed routes and fixings. Wherever possible ducts, chases and holes are to be formed during construction rather than cut.

440 MECHANICAL AND ELECTRICAL SERVICES must have final tests and commissioning carried out so that they are in full working order at Practical Completion.

SUPERVISION/INSPECTION/DEFECTIVE WORK

510 SUPERVISION: In addition to the constant management and supervision of the works provided by the Contractor's person in charge, all significant types of work must be under the close control of competent trade supervisors to ensure maintenance of satisfactory quality and progress.

515 CO-ORDINATION OF ENGINEERING SERVICES: The site organisation staff must include one or more persons with appropriate knowledge and experience of mechanical and electrical engineering services to ensure compatibility between engineering services, one with another and each in relation to the Works generally. Submit to the EA, when requested, CVs or other documentary evidence relating to the staff concerned.

520 PERSON-IN-CHARGE: Give maximum possible notice to CA before changing the person-in-charge.

540 OVERTIME WORKING: Whenever overtime is to be worked, give EA not less than 14 days notice, specifying times, types and locations of work to be done. Concealed work executed during overtime for which notice has not been given may be required to be opened up for inspection and reinstated at the Contractor's expense.

550 DEFECTS IN EXISTING CONSTRUCTION to be reported to EA without delay. Obtain instructions before proceeding with work which may:
- Cover up or otherwise hinder access to the defective construction, or
- Be rendered abortive by the carrying out of remedial work.

555 ACCESS FOR INSPECTION: Give CA/EA not less than 14 days notice before removing scaffolding or other facilities for access.

560 TIMING OF TESTS AND INSPECTIONS: Agree dates and times of tests ad inspections with CA several days in advance, to enable the CA and other affected parties to be present. On the previous working day to each such test or inspection confirm that the work or sample in question will be ready or, if not ready, agree a new date and time.

565 TEST CERTIFICATES: Submit a copy of each certificate to CA as soon as practicable and keep copies of all certificates on site.

570 PROPOSALS FOR RECTIFICATION OF DEFECTIVE WORK/PRODUCTS:
- As soon as possible after any part(s) of the work or any products are known to be not in accordance with the Contract or appear that they may not be in accordance submit proposals to EA for opening up, inspection, testing, making good, adjustment of the Contract Sum, or removal and re-execution.
- Such proposals may be unacceptable to the EA and he may issue contrary instructions.

580 MEASURES TO ESTABLISH ACCEPTABILITY: Wherever inspection or testing shows that the work, materials or goods are not in accordance with the Contract and measures (e.g. testing, opening up, experimental making good) are taken to help in establishing whether or not the work is acceptable, such measures:
- will be at the expense of the Contractor, and
- will not be considered as grounds for extension of time.

590 QUALITY CONTROL: Establish and maintain procedures to ensure that the Works, including the work of all subcontractors, comply with specified requirements. Maintain full records, keep copies on site for inspection by the CA, and submit copies of particular parts of the records on request. The records must include:
- Identification of the element, item, batch or lot including location in the Works.
- The nature and dates of inspections by the Contractor, EA or CA, tests and approvals.
- The nature and extent of any nonconforming work found.
- Details of any corrective action.

WORK AT OR AFTER COMPLETION

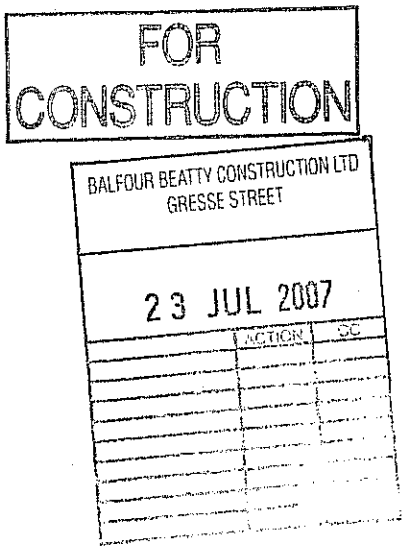
610 GENERALLY:

- Make good all damage consequent upon the work.
- Remove all temporary markings, coverings and protective wrappings unless otherwise instructed.
- Clean the works thoroughly inside and out including all accessible ducts and voids, remove all splashes, deposits, efflorescence, rubbish and surplus materials consequent upon the execution of the work.
- Cleaning materials and methods to be as recommended by manufacturers of products being cleaned, and to be such that there is no damage or disfigurement to other materials or construction.
- Obtain COSHH dated data sheets for all materials used for cleaning and ensure they are used only as recommended by their manufacturers.
- Touch up minor faults in newly painted/repainted work, carefully matching colour, and brushing out edges. Repaint badly marked areas back to suitable breaks or junctions.
- Adjust, ease and lubricate moving parts of new work as necessary to ensure easy and efficient operation, including doors, windows, drawers, ironmongery, appliances, valves and controls.

640 SECURITY AT COMPLETION: Leave the Works secure with all accesses locked. Account for and adequately label all keys and hand over to Employer with itemised schedule, retaining duplicate schedule signed by Employer as a receipt.

650 MAKING GOOD DEFECTS: Make arrangements with the Employer and give reasonable notice of the precise dates for access to the various parts of the Works for purposes of making good defects. Inform CA/EA when remedial works to the various parts of the Works are completed.

END



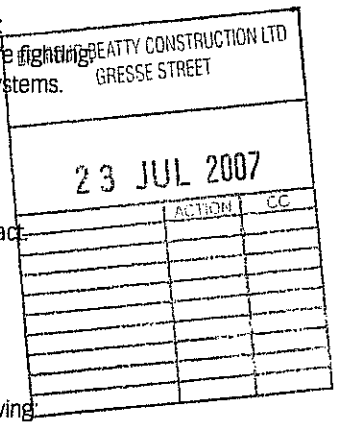
A37 OPERATION/ MAINTENANCE OF THE FINISHED BUILDING

110 THE BUILDING MANUAL

- Purpose: The Building Manual (incorporating the Health and Safety File) is to be a comprehensive information source and guide for the Employer and end users providing a complete understanding of the building and its systems to enable efficient and safe operation and maintenance.
- Compilation:
  - Prepare all information for Contractor designed or performance specified work including as-built drawings.
  - Obtain or prepare all other information to be included in the Manual.
- Content:
  PART 1: GENERAL: Content as clause 130.
  PART 2: BUILDING FABRIC: Content as clause 140.
  PART 3: BUILDING SERVICES: Content as clause 150.
- Presentation of Manual: As clause 161.
- Reviewing the Manual:
  - Review process: Submit a complete draft. Amend in the light of any comments and resubmit to the EA. Do not proceed with production of the final copies until authorized by the EA.
  - Latest date for submission: 12 weeks before the date for submission of final copies.
- Final copies of the Manual:
  - Number of copies: 6.
  - Latest date for submission: 6 weeks before the date for completion stated in the contract.
- As-built drawings:
  - Number of copies: 6 .
  - Medium: A3 sized paper and CD-ROM disk.

120 THE HEALTH AND SAFETY FILE

- Purpose: To provide information about the structure or materials used which might affect the health or safety of anyone if construction works (including cleaning, maintenance, alterations, refurbishment and demolition) are carried out.
- Contractor designed and performance specified work: Obtain or prepare the following and submit to the Planning Supervisor:
  - Details of key structural principles, including safe working floor and roof loads.
  - Details of construction methods and materials, including COSHH dated data sheets, which may present residual hazards.
  - General maintenance instructions including access provision and information about equipment provided for cleaning and maintaining the building fabric.
  - As-built drawings.
- Other information: Obtain or prepare the following and submit to the Planning Supervisor:
  - The nature, location and markings of utilities and services, including emergency and fire fighting.
  - Instructions for operation, maintenance, dismantling and removal of equipment and systems.
  - Details of hazards associated with the materials used in the construction.
  - Access requirements/ restrictions.
- Copies of the File:
  - Number of copies: 6.
  - Latest date for submission: 6 weeks before the date for completion stated in the contract.

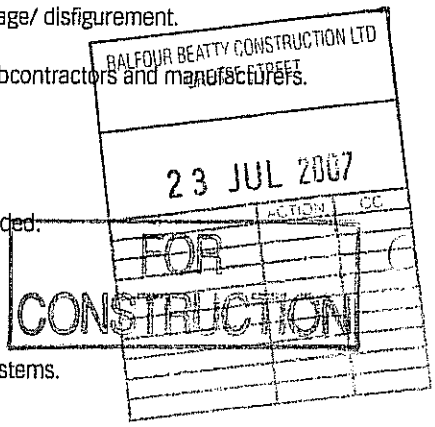


130 CONTENT OF THE BUILDING MANUAL PART 1: GENERAL

- The property:
  - A description of the buildings.
  - Details of ownership.
- The parties: Names, addresses (including e-mail), telephone and fax numbers of the following:
  - Consultants and designers.
  - Authorities and statutory undertakers plus copies of consents and approvals.
  - Contractors, subcontractors, suppliers and manufacturers.
  - Maintenance contractors.
- Operational requirements and constraints of a general nature: Include details not relevant to other parts of the Building Manual.
- The fire safety strategy for the buildings and site: Include drawings showing fire appliance routes, emergency escape routes, fire resisting doors, location of emergency and fire fighting systems, services shut-off valves, switches, etc.

140 CONTENT OF THE BUILDING MANUAL PART 2: BUILDING FABRIC

- Design criteria: Floor and roof loadings, loading restrictions, insulation values, fire ratings and other performance requirements.
- Construction of the building:
  - A detailed description of methods and materials used.
  - As-built drawings recording details of construction for all Contractor designed work and performance specified work, together with an index.
  - Information about repair, renovation or demolition.
- Maintenance of the building fabric: Instructions for general maintenance detailing work to be done, acceptable tolerances and frequency of operation.
- Product details: Copies of manufacturers' current literature including COSHH dated data sheets and recommendations for cleaning, repair and maintenance.
- Environmental and trafficking conditions: Details of those that may result in damage/ disfigurement.
- Fixtures and fittings: Schedules including manufacturer and product reference.
- Guarantees, warranties and maintenance agreements: Obtain from suppliers, subcontractors and manufacturers.
- Test certificates and reports required in the specification.



150 CONTENT OF THE BUILDING MANUAL PART 3: BUILDING SERVICES

- Description of the systems:
  - Ensure that the Employer's staff fully understand the scope and facilities provided.
  - List maximum loads, services capacity and restrictions.
  - Include limitations of any user performance.
- Operation:
  - A description of the mode of operation of all systems.
  - Starting up, operating and shutting down instructions for all equipment and systems.
  - Control sequences for all systems.
  - Procedures for seasonal changeovers.
  - Procedures for fault finding.
- Diagrammatic drawings: For each system, indicating principal items of plant, equipment, valves, etc.
- Record drawings: Photo-reduced and with an index. Size: A3 .
- Identification of services: A legend for colour-coded services.
- Schedules (system by system) of plant, equipment, valves, etc: Include locations, duties, performance figures and unique numbers cross-referenced to the record drawings, diagrammatic drawings and schedules.
- Product details:
  - Name, address and telephone number of the manufacturer of every item of plant and equipment together with catalogue list numbers.
  - Manufacturers' technical literature for plant and equipment. Include detailed drawings, electrical circuit details and operating and maintenance instructions.
  - Instructions for dismantling and removing equipment and systems.
- Test certificates (including but not limited to electrical circuit tests, corrosion tests, type tests, works tests, start and commissioning tests): For the plant, equipment, valves, etc., used in the installations.
- Guarantees, warranties and maintenance agreements: Obtain from subcontractors and manufacturers.
- Equipment settings: Schedules of fixed and variable equipment settings established during commissioning.
- Preventive maintenance: Recommendations for frequency and procedures to be adopted to ensure the most efficient operation of the systems.
- Lubrication: Schedules for lubricated items.
- Consumables: A list of normal consumable items.
- Spares: A list of recommended spares to be kept in stock by the Employer, being those items subject to wear or deterioration and which may involve the Employer in extended deliveries when replacements are required at some future date.
- Emergencies: Procedures, including telephone numbers for emergency services.

161 PRESENTATION OF BUILDING MANUAL

- Format: A4 size, white coloured plastics covered, loose leaf, four-ring binders with hard covers, each indexed, divided and appropriately titled on both front cover and spine.
- Selected drawings needed to illustrate or locate items mentioned in the Manual: Where larger than A4, to be folded and accommodated in the binders so that they may be unfolded without being detached from the rings.
- As-built drawings: The main sets may form annexes to the Manual.

210 INFORMATION FOR COMMISSIONING OF SERVICES

- General: Submit relevant drawings and preliminary performance data to the EA to enable Employer's staff to familiarise themselves with the installation.

- Time of submission: At commencement of commissioning.

220 TRAINING
- Objective: Before Completion, explain and demonstrate to Employer's maintenance staff the purpose, function and operation of the installations including all items and procedures listed in the Building Manual.
- Operating time: Include a minimum of 14 days.

230 SPARE PARTS
- Details: Before Completion submit to the EA a priced schedule of spare parts that the Contractor recommends should be obtained and kept in stock by the Employer for maintenance of the services installations.
- Include in the priced schedule for:
  - Manufacturer's current prices, including packaging and delivery to site.
  - Checking receipt, marking and numbering in accordance with the schedule of spare parts.
  - Referencing to the plant and equipment list in Part 3 of the Building Manual.
  - Painting, greasing, etc. and packing to prevent deterioration during storage.
- Latest date for submission: 12 weeks before the date for completion stated in the contract.

250 TOOLS
- General: Provide tools and portable indicating instruments for the operation and maintenance of all services plant and equipment together with suitable means of identifying, storing and securing.
- Quantity: Two complete sets.
- Time of submission: At Completion.

END

A50 GENERAL PERFORMANCE REQUIREMENTS SPECIFICATION

To be read with Preliminaries/General conditions

111 PURPOSE:
The purpose of the document is to describe the performance requirements of the works to be carried out by the Contractor in relation to all elements of the building.

112 SCOPE:
- The Contractor shall complete the tasks which include inter alia:- design, production of shop drawings, provision of samples, mock-ups and prototypes, testing, fabrication, transportation to site, erection, commissioning and provision of as-built drawings and technical manuals.

113 OTHER DOCUMENTS:
- The requirements of this document is in addition to the general requirements of all other documents.

114 CONFLICTS & AMBIGUITY:
- Where there is any conflict or ambiguity within or between documents, drawings or published standards, the Contractor shall point this out at tender return stage for clarification. Failing this the documents with the most onerous condition (as directed) will apply.

115 SYSTEM DESCRIPTIONS:
- The Contractor shall take special care in referring to the documents or when issuing them to others and shall ensure that all relevant aspects are provided. In all cases the requirements of this General Performance Requirements Specification shall be adhered to.

TENDERING

120 ALTERNATIVE TENDERS:
In addition to and at the same time as conducting the tenders for the Contracts as defined in the tender documents, the Contractor may, at his discretion, submit alternative design proposals and/or method(s) of construction/installation for consideration. Alternatives which would involve significant changes to other work or visual appearance will not be considered.
- Such alternative(s) will be deemed to be alternative tender(s) and each shall include a complete and precise statement of the effect is on cost and programme.
- Full technical data for each such alternative shall be submitted together with details of any consequential amendments to the design and/or construction/installation of other parts of the Works.

122 EQUIVALENT PRODUCTS:
- The Contractor may substitute an alternative product of different manufacture provided that before ordering the product he demonstrates:-
- The equivalence of his proposed alternative in regard to material,performance, safety, reliability, fitness for purpose and where appropriate, visual appearance.
- Where relevant, the availability of spares and service and cost thereof.
  Longevity.
  The Contractor shall provide samples and test reports (in English) as required at his own cost to demonstrate equivalence.

124 TECHNICAL INFORMATION:
Technical details relating to the Contractor's tender shall be submitted as detailed in the various Specifications.

126 LIST OF PROPOSED MANUFACTURERS/SUPPLIERS:
Details of products, equipment and plant, including all items for which the choice of manufacturer/supplier is at the discretion of the Contractor shall be submitted with the tender.

DESIGN RESPONSIBILITY & COPYRIGHT

130 GENERAL OBJECTIVE:
- The Contractor shall provide works to the best possible standards in accordance with this objective noting in particular that the visual character of the project is considered of great importance.

132 PERFORMANCE & VISUAL REQUIREMENTS:
- This Specification together with the drawings and other specifications only define the performance and visual requirements of the Works described in the Contract documents.
- The Contractor shall detail and design the works to meet the requirements set out in the conditions of Contract, Specifications, drawings and all other criteria which in their specialist knowledge are relevant to the design and installation of the works.

134 RELIANCE ON CONTRACTOR:
- Although a preference for a particular material, design, type of construction, or dimension may be stated in any specification or on the drawings, no warranty is given as to the accuracy of such dimensions or the adequacy of performance or buildability of such details or that the materials indicated are suitable or reasonably fit for their intended purpose.
- In such cases if the Contractor is not sure that the preference indicated will satisfy the requirements of the documents then the Contractor shall make alternative proposals when submitting his tender or the preferences indicated shall be deemed to form part of his proposals, subject to the visual and performance requirements being met. The Employer relies upon the specialist skill and knowledge of the Contractor and it shall be the duty of the Contractor to satisfy himself as to such matters. In the absence of any such proposals, comments or observations the Contractor shall be deemed to have accepted and approved such requirements, stipulations or preferences which shall then form part of his tender and contract.

136 COMMENTS:
- In relation to any drawings prepared by or on behalf of the Contractor and submitted for comment, whether before or after acceptance of any tender (including during the currency of the Works), the Employer again relies on the specialist skill and knowledge of the Contractor and any comment given shall be a comment only as regards visual appearance and no such comment shall in any way alter or detract from the duties of the Contractor as set out in the clauses as above.

138 COPYRIGHT AND PATENT RIGHTS:
- The copyright in any design or installation details developed for this project under the Employer's direction shall be vested in Lifschutz Davidson Limited and may not apply to standard products and designs already in existence before date of tender.

140 INFRINGEMENT OF COPYRIGHT:
- The Contractor and suppliers shall save harmless and indemnify the Employer and his representatives from and against all claims and proceedings for or on account of infringement of any patent rights, design trademark or name, licensing agreements or other protected rights in respect of any constructional plan, machine work, design, assemblies, components or material used for or in conjunction with the Contract Works and from and against all claims, proceedings, damages, costs, charges.

142 DISCLOSURE:
The nature of the design and construction work performed and any information belonging to the Employer, with which the Contractor may become familiar, shall be treated as confidential and may not be disclosed without the written consent of the Employer. The Contractor shall not publish any drawings, sketches or photographs of the Works or building or its construction without the prior written.

DETAIL DESIGN

150 DESIGN & DETAILING:
The Contractor shall complete the design and issue all of the relevant drawings, samples or other information in accordance with the Contract programme. They shall design and detail the work and provide complete production information (including, as appropriate, fabrication and installation drawings, all design calculations, specifications etc.) based on the drawings, specifications and other information provided in the Contract. The Contractor shall liaise with other Contractors and others as necessary to help ensure co-ordination of the work with related building elements and services all in accordance with the Contract programme.
The requirements also apply to building services installations, refer to clause 380.

153 INFORMATION:
The Contractor shall request additional information as necessary and provide information as necessary in time to meet the programme.

154 SUBMISSION:
The Contractor shall submit five copies of his own design/production information.

156 INSPECTION BY EMPLOYER:
The Employer will inspect the design/production information, record his comments and return to the Contractor. Additional time shall be allowed by the Contractor, as necessary for inward/outward despatch.

158 AMENDMENTS:
The Contractor shall make any necessary amendments without delay. Unless and until it is confirmed that resubmission is not required, he shall resubmit for further checking and comment, and incorporate any necessary amendments all as before.

160 VARIATIONS:
If submitted design/production information differs from the requirements of the Contract documents each such difference shall be the subject of a request for substitution or Variation, supported by all relevant information.

162 AMENDMENTS REQUIRED BY THE EMPLOYER:
Should any amendment to design/production information required be considered to involve a Variation which has not already been acknowledged as a Variation, the Contractor shall notify without delay and in any case within 7 days, and not proceed with ordering, fabrication, or fixing until subsequently instructed. Claims for the extra cost of such work, if made after it has been carried out, may not be allowed.

164 DISTRIBUTION OF FINAL VERSION:
The Contractor shall submit 5 copies of final design/production information and other copies as necessary to all affected parties.

166 PRODUCTION INFORMATION:
The Contractors shall:
- Liaise with the other Contractors and others as necessary to help ensure coordination of the work with related building elements and services.
- Provide drawings and other information as specified showing such details of the work as may reasonably be required.
- Submit for inspection, make any necessary amendments and resubmit for further inspection unless confirmed that this is not necessary.
- Submit sufficient copies of final information to all affected parties.

168 DRAWINGS AND OTHER INFORMATION:
- All material provided by the Contractor shall comply with standards agreed in advance and shall include at least:
  - Full size details of all component intersections and interfaces with adjoining works.
  - 1:5 Component assembly drawings.
  - 1:20 General arrangement drawings.
  - 1:50/1:150 Component location drawings.
  - Three dimensional detail drawings to illustrate complex junctions.
- Method statement including analysis and commentary of each aspect of the design including consideration of matters specifically referred to in this specification, cross referenced accordingly.

170 BUILDER'S WORK INFORMATION:
The Contractor shall confirm and amplify any information provided in the contract drawings and specification to ensure appropriate builders work is defined and shown on the relevant drawings. The Contractor shall then arrange to carry out all builders work including that required to accommodate Contract works without additional cost to the Contract.

172 CO-ORDINATION DRAWINGS:
- The Contractor shall prepare co-ordination drawings of all critical junctions between separate Contracts (eg. M&E services, structure, external walling and fit-out elements) and the works not designed by the Contractor. Such drawings shall be of adequate scale (1:5 or 1:1) and complexity to illustrate fully:-
  - The zones in which each Contractor is operating or permitted to operate.

- The identity of each Contractor against each element of the interface to determine who does what.
- The interface detail (eg. lap, flashing, joint, movement joint, fixing or connection) agreed with the relevant Contractor(s).
- The sequence of construction of each element.

- Co-ordination drawings shall be circulated to all relevant Contractors and updated regularly as the design of each Contract proceeds.
- The purpose of the co-ordination drawings is to ensure that all the Contract Works can be assembled on site without cutting, alteration or unsightly details and in conformity with the Contract drawings.

PROVISION OF SAMPLES, MOCK-UPS & PROTOTYPES

200 DEFINITION OF MOCK-UP/PROTOTYPE:
A mock up is a to scale, full size replica not necessarily using the actual materials. A prototype is a to scale full size sample using actual materials and methods of intended production. Where sample is referred to in the following sections, it shall mean sample, prototype, mock-up or reference panel.

202 GENERALLY:
- Where particular requirements are not detailed in the specifications, the Contractor shall provide samples of all materials, components and work. The Contractor shall provide all additional samples to those specified as is reasonably practicable and without additional cost. Samples obtained by the Contractor shall be in addition to any that may be obtained independently by the Employer.
- The Contractor shall provide/prepare samples in such a way as to allow reasonable time to consider each item in isolation and in relation to other items. The Contractor shall modify, move and adapt samples as directed. Additionally, he shall provide/prepare samples as and when required.
- Where samples are provided for final approval prior to incorporation/ commencement of the Works they shall be in compliance with the contract requirements. The Contractor shall not submit unrepresentative samples.

204 MINIMUM REQUIREMENTS:
The Contractor shall make specific recommendations for samples, mock-ups and prototypes at the time of tender, and shall provide the minimum requirements noted in the various Sections of the Specifications and Contract. The Contractor shall allow sufficient time for the selection, consideration, provision of additional samples and approvals.

206 SCHEDULE OF SAMPLES:
Within 14 days of the commencement of the Works the Contractor shall submit a schedule of samples and programme for the preparation, delivery, installation, modification, consideration, approval and re-approval of samples. He shall revise and update this as may be required from time to time.

208 STORAGE OF SAMPLES:
The Contractor shall catalogue, mark, display and store all samples in a designated area(s) and shift and modify them as necessary as the Works progress. He shall maintain samples in a representative condition throughout the duration of the work and obtain approval prior to the disposal of all samples. Samples shall be displayed and stored so as to allow inspection in natural daylight or by artificial lighting as directed. The Contractor shall position and reposition samples in relation to each other and temporarily position samples in locations as directed.

210 SAMPLES OF FINISHES:
- Where a choice of material, colour, finish or texture is available, the Contractor shall submit full manufacturer's information in order for the Employer to choose from the samples provided. Generally with regard to choice of finish, the Employer requires that a number of initial, smaller samples are required. From these samples a number will be selected for incorporation into and preparation of final samples. A minimum of 3 reference samples will be required in the case of surface finishes and textures. These samples will be used to control the range of permitted deviation in the completed works.
- All metal samples shall be unpainted for approval of welds/castings. Following approval, the same samples shall be corrosion protected and painted or finished as appropriate for approval of final appearance by the Employer.

212 RE-USE OF SAMPLES:
Where samples do not originally form part of the Works they shall only be incorporated into the works with express approval. Only approved samples will be considered for incorporation into the Works.

214 APPROVAL OF SAMPLES:
- Where approval of products or materials is specified, the Contractor shall submit samples or other evidence of suitability. He shall not confirm orders or use materials until approval of samples has been obtained. He shall retain

approved samples in good, clean condition on site for comparison with products, materials and finishes used in the Works and remove them when no longer required.

- Inspection or any other action shall not be taken as approval of materials, products or work unless so confirmed in writing in express terms referring to:
  - Date of inspection
  - Part of the work inspected
  - Respects or characteristics which are approved
  - Extent and purpose of the approval
  - Any associated conditions.
  - Samples and reference panels shall not be altered or modified during or following approval without written approval.
- In relation to any matter submitted for approval before or after any tender (including during the currency or after the claimed execution of the Works), the Employer relies on the specialist skill and knowledge of the Contractor and any approval given shall be an approval only as regards visual appearance and no such approval shall in any way alter or detract from the duties of the Contractor implied, stated or otherwise. Similarly Certification of payment shall not be deemed to be approval of Works or any part thereof.

FOR CONSTRUCTION

216 PROTOTYPES, FIXINGS & FASTENERS:
All prototypes shall include fixings and fasteners.

218 PROTOTYPE TESTING GENERALLY:
- All prototypes shall be subject to a detailed evaluation of their design and performance to ensure compliance with the Specifications and the drawings prior to giving any authorisation to manufacture.
- The Contractor shall return at the time of tender the specific recommendations related to tests of their prototypes, but the tests in the following sections are the minimum required.

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25 JUL 2007
ACTION | QC

220 PROTOTYPE WELD TESTING:
During fabrication of the prototypes, the Contractor shall 100% test all welding using weld testing procedures specified and shall report his findings.

222 PROTOTYPE TOLERANCES:
The Contractor shall measure the prototypes to check the fabrication tolerances and report the findings.

224 PROTOTYPE TESTS OF WINDOWS, DOORS:
- Tests of window and door units including their junctions with adjacent units will be required unless test reports of identical forms of construction can be provided. Prototype units shall be tested in a window testing rig at an independent testing station in accordance with BS 5368 "Method of Testing Windows" (Part 1:1976 Air Permeability, Part 2:1980 Water Penetration, Part 3:1978 Wind Resistance followed by a repeat of Parts 1 and 2). Further tests shall be carried out as follows:-
- Water Penetration Under Dynamic Pressure Variations
  Thermal Cycling Tests to Taywood Engineering Standa
- Tests shall also be carried out to assess the influence
  the following:
  - Wind sway
  - Live/live Load deflection
  - Snow loads
  - Frame creep
  - Thermal expansion and contraction
- For all the above tests not covered under BS, testing m
  Employer and Taywood Engineering or equal approved independent Testing Station.

TESTS . !
Dynamic
Thermal

226 LOAD TESTS OF PROTOTYPES:
The Contractor shall load test the structure, of all prototypes.

230 TESTS OF PAINT/COATINGS:
Tests shall be carried out to determine film thicknesses of each layer and to demonstrate compliance with the paint manufacturers' specification in accordance with BS 6001 level 2 normal inspection.

232 TESTS OF MECHANICAL & ELECTRICAL EQUIPMENT:
Tests of all samples of all mechanical and electrical equipment proposed for the Works will be required unless test reports for identical equipment are available. Tests shall conform to the relevant BS methods where they exist, otherwise the methods shall be agreed with the Employer.

234 TEST REPORTS:
At the conclusion of any test the Contractor shall produce a detailed technical test report, including sketches or photographs of the test rig and sketches or photographs of the progress of the tests as well as certificates of the performance of the Works in respect of the requirements of the Specification.

236 COMMENCEMENT OF MANUFACTURE:
The Contractor shall not permit manufacture of any components prior to inspection of the prototypes and the carrying out of the successful tests.

MANAGEMENT OF SUB CONTRACTS

300 GENERALLY:
The Sub Contractors shall co-operate with all other Sub Contractors, suppliers, Local Authorities and Statutory bodies in the execution of the work.

302 COMPLIANCE WITH STATUTORY AUTHORITIES ETC:
The Sub Contractors shall be fully responsible for ensuring that the works comply in all respects with all Statutory Regulations, Requirements and relevant Codes of Practice.

304 SUBMISSIONS TO STATUTORY AUTHORITIES:
- At the appropriate stage of the project, consultations may take place with the Statutory Authorities which shall involve the Sub Contractors.
- The Contractor/ Sub Contractors shall fully co-operate with these consultations at no extra cost.
- Where the requirements of the Statutory Authorities call for the submission to them of any component part of the Works for approval, testing, stamping or certifying the Contractor / Sub Contractors shall at his own expense submit and deliver any such component part to the place required by such Authority. After such component part has been satisfactorily approved, tested, stamped or certified the Contractor / Sub Contractors shall return it to site for incorporation in the Works and any expense shall be paid by the the Contractor / Sub Contractors.
- In such a situation, if the components are rejected then the Contractor / Sub Contractors shall replace the component part(s) with acceptable ones, at no additional cost.

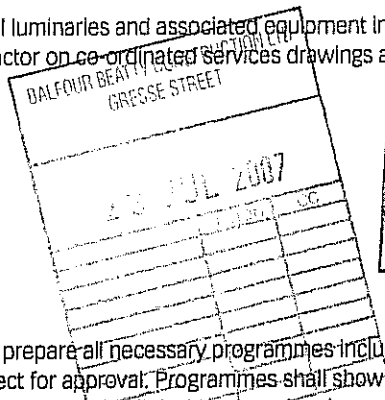
306 PHOTOGRAPHS:
The Contractor / Sub Contractors shall provide periodic progress photographs of the Contract Works taken from several different angles at agreed intervals and submit 2 prints size 150 x 100mm of each negative. Photographs shall also be provided to record the off-site preparation, assembly and finishing of the Works. These requirements are in addition to progress photographs of the site stated elsewhere.

308 SERVICES INFORMATION:
- The Contractor/ Sub Contractor shall indicate all services on his drawings with actual locations and sizes of services in accordance with specified design principles and the anticipated method of installation and shall co-ordinate all Works to ensure that the locations and sizes of services detailed on the Contractor / Sub Contractors drawings are properly installed.
- Unless where specifically approved by the CA, the building services installations shall be concealed except in areas allocated on the architect's drawings, and will be limited to:
  - plant rooms / areas
  - designated ducts
  - services risers
  - below ground
  - concealed conduits and trunkings

  Where approval for exposed services is sought, co-ordinated drawings, schedules, samples etc. shall be submitted for the CA's approval.
- Locations and detailed setting out of all visible mechanical and electrical equipment and accessories are to be identified by the contractor on co-ordinated services drawings and submitted for the CA's approval, including, (but not limited to):
  - supply / extract air grilles
  - smoke detectors
  - fire alarm call points
  - fire alarm sounders
  - passive infra red detectors
  - CCTV cameras

- temperature sensors
- luminaires
- electrical switches
- socket outlets
- disabled alarm call points
- security card readers

- Locations and detailed setting out of all luminaries and associated equipment in relation to other visible services items are to be identified by the contractor on co-ordinated services drawings and submitted for the CA's approval, including, (but not limited to):
  - supply / extract air grilles
  - smoke detectors
  - fire alarm sounders
  - passive infra red detectors
  - CCTV cameras
  - photo cells



310 PROGRAMMING:
The Contractor / Sub Contractors shall prepare all necessary programmes including the Contract Programme, for the planning and execution of the Project for approval. Programmes shall show inter alia the Contract broken down into its make-up components (eg outline design, detail design, shop drawings, samples, mock-ups, prototypes, testing, fabrication, delivery, erection) and critical interactions with other Contract sequences. The Contractor / Sub Contractors shall include for working sessions and meetings on both a regular and ad-hoc basis involving himself, any interested party, one or more other Sub Contractors and suppliers as necessary in the Employers offices. The Employer requires one week's notice of any meeting to be held.

312 ADVICE ON LABOUR & MATERIALS:
The Contractor / Sub Contractors shall advise on the availability of labour and materials and time requirements for off-site design and manufacture of components and installation and construction.

314 MONITORING THE PROGRESS OF SUB CONTRACTORS:
The Contractor shall monitor and report the progress of the Sub Contracts, the production of the design information, the procurement of materials and the progress of the Works on and off site.

316 ADJUSTMENT OF PROGRAMMES:
The Contractor / Sub Contractors shall adjust the programmes referred to above as may be necessary provided that the completion date(s) shall only be adjusted in accordance with the Contract.

318 SHORT TERM PROGRAMMES:
The Contractor / Sub Contractors shall prepare any short term sub-programmes as may be requested to indicate procurement activities and/or the intended plan of working.

320 COPIES OF PROGRAMMES TO BE ISSUED:
The Contractor / Sub Contractors shall issue copies of all programmes and to others that he may designate.

322 DOCUMENTATION:
The Contractor / Sub Contractors shall maintain the documentation of his performance in an approved form. He shall report on physical progress of the construction and the off-site Works in the format and with the frequency acceptable to the Employer. He shall maintain records of quality tests or opening up for inspection as required.

MATERIALS & WORKMANSHIP

340 STANDARDS GENERALLY:
- Materials and Workmanship shall be of the highest standard and all Works shall be carried out to the satisfaction of the Employer.
- The Contractor shall be responsible for all materials and components supplied or manufactured on his behalf by Sub Contractors or suppliers under the conditions of this Specification.

342 BRITISH STANDARDS:

- As a minimum, all materials and workmanship shall be in accordance with the latest British Codes and Standards current at the date of the enquiry. But the Contractor's attention is drawn to the fact that in most cases standards higher than these are specified.
- Materials which have been produced to equivalent internationally established Standard may be offered as alternatives provided they also comply with the specified Standard. The Contractor shall demonstrate such equivalence supplying expert assessment and translation as necessary. The use of such materials shall only be carried out with the prior written approval.
- Where Codes and Standards are not defined specifically, the appropriate British Standard shall be deemed to apply. In the event of conflict between any referenced Code or Standard and this specification, the more onerous Requirement (as directed) shall apply.
- All Works shall comply with the Building Regulations and all other local Statutory requirements, including Highways, Development Control, Waste Disposal etc.

344 ACCEPTANCE OF STANDARDS:

The Contractor shall provide all necessary assistance, as required in order to obtain acceptance of equivalent standards with Statutory Authorities and comply with regulations.

346 GOOD PRACTICE

Where and to the extent that materials, products and workmanship are not fully detailed or specified they shall be:
. Of a standard appropriate to the Works and suitable for the purposes stated in or reasonably to be inferred from the Contract documents and drawings.
. In accordance with good building practice.

348 MARKINGS/LABELS

All manufacturers labels, marks and identification plates to products and materials exposed in the completed works shall be removed, leaving no evidence of the presence of such items. Where plates/marks are required for operating and maintenance purpose the design, location and position shall be agreed with the Employer. This requirement also applies to lift equipment including cars, doors, architraves, surrounds and thresholds.

350 HEALTH HAZARDS & BANNED MATERIALS:

- Materials used shall not in any way be a potential hazard (eg. materials containing loose fibres). The Contractor shall be deemed to have an up to date knowledge of all relevant research and legislation in this regard.
- The following materials shall not be used in any part of the Works:-
  1) High Alumina Cement or Concrete
  2) Woodwool Slabs
  3) Blue Asbestos
  4) Calcium Silicate Bricks
  5) Calcium Chloride
  6) Non Renewable Timber
  7) CFC's Other Than in Mechanical Refrigeration Plant
  8) Sea Dredged Aggregates

352 OFF-SITE FABRICATION:

- Site Works shall be limited to erection and installation only with site welding, cutting or painting prohibited except where specifically noted on the Contract drawings.
- In regard to all Works, off-site fabrication shall be carried out wherever possible and the onus will be on the Contractor to prove that off-site fabrication is not possible or economic.

354 BS 8000: BASIC WORKMANSHIP:

- The Contractor shall comply with the relevant recommendations of BS 8000.
- If there is any conflict or discrepancy between the recommendations of BS 8000 on the one hand and the project documents on the other, the most onerous condition (as directed) will prevail.

356 GENERAL QUALITY OF WORKMANSHIP:

The Contractor shall:

- Ensure that operatives are appropriately skilled and experienced for the type and quality of work. Curriculum vitaes shall be provided as requested.
- Inspect components/materials carefully before fixing or using and reject any which are defective.
- Fix or lay securely, accurately and in alignment.
- Use fixings/accessories and bedding/jointing materials/methods recommended for the purpose by the manufacturer of the component/material being fixed or laid.

- Provide suitable, tight packings at screwed and bolted fixing points to take up tolerances and prevent distortion. Fixings must not be over tightened.
- Adjust location and fixing components so that joints which are to be finished with mortar or sealant or otherwise left open to view are even and regular.
- Ensure that all moving parts operate properly and freely. Pre-finished components shall not be ground, cut or planed, to remedy binding or poor fit without approval.

358 SURFACE PREPARATION OF MATERIALS:

- On all materials subject to surface treatment special attention shall be given to the sub-base to ensure that the preparation is correct. All superficial dust and friable materials shall be removed.
- Where adhesives/sealants are used, care shall be taken in the preparation and application of correct de-greasing sealant and bonding agents. The Contractor shall ensure that the adhesive/sealant is suitable for the purpose intended and that it is used in strict accordance with the manufacturer's instructions.

360 JOINTING:

All elements including panels, mullions, trusses and so on shall be made as single pieces and joined at the points or nodes shown on the drawings. Additional joints may not be inserted by the Contractor and therefore due allowance must be made for the form and method of transportation and handling of the Works as shown

362 SITE WELDING:

There shall be no site welding except where specifically indicated on the drawings.

364 SITE CUTTING:

- Site cutting shall be limited to the absolute minimum.
- The Contractor / Sub Contractor shall not cut, drill or otherwise alter the work of other trades or his own work to accommodate other trades unless such work is clearly specified in the approved drawings.
- All methods, principles, details etc, for site cutting of components shall be submitted for approval. Manufacture shall not commence until the Contractor has demonstrated his proposed techniques and details for approval.

366 PROTECTION OF PRODUCTS & MATERIALS:

The Contractor shall protect the works by:

- Preventing over-stressing and any other type of physical damage.
- Keeping clean and free from contamination and staining all materials and elements of the works.
- Keeping materials dry and a suitably low humidity atmosphere to prevent premature setting, moisture movement and similar defects. Where appropriate they shall allow free air movement around and between stored components.
- Preventing excessively high or low temperatures and rapid changes of temperature in the material.
- Protecting adequately from rain, frost, sun and other elements as appropriate. This includes elements such as cement etc, used in the construction of the building.
- Ensuring that sheds and covers are of ample size, in good weatherproof condition and well secured.
- Keeping different types and grades of materials separately and adequately identified.
- So far as possible, keeping materials in their original wrappings, packings or containers, with unbroken seals, until immediately before they are used.
- Wherever possible, retaining protective wrappings after fixing and until shortly before Practical Completion.
- Ensuring that protective measures are fully compatible with and not prejudicial to the products/materials.
- Providing purpose made packings as necessary to ensure that completed fabrications are not damaged in transport.
- Providing adequate timber or plastic protection against damage.

368 WORK AT OR AFTER COMPLETION:

At completion of the works, The Contractor shall:

- Make good all damage consequent upon the work.
- Remove all temporary markings, coverings and protective wrappings unless otherwise instructed.
- Clean the Works thoroughly inside and out, including all accessible ducts and voids, remove all splashes, deposits, efflorescence, rubbish and surplus materials consequent upon the execution of the work. Cleaning materials and methods shall be as recommended by the manufacturers of products being cleaned, and to be such that there is no damage or disfigurement to other materials or construction.
- Touch up minor faults in newly painted/repainted work, carefully matching colour, and spraying out edges. Repaint badly marked areas back to suitable breaks or junctions.
- Remove and replace badly marked shop finished components.
- Adjust, ease and lubricate moving parts of new work as necessary to ensure easy and efficient operation, including doors,windows, drawers, ironmongery, appliances, valves and controls.

370 SECURITY AND COMPLETION:
The Contractor shall leave the Works secure with all accesses locked. He shall account for and adequately label all keys and hand over with itemised schedule, retaining a duplicate schedule signed as a receipt.

QUALITY, SUPERVISION AND TESTING

400 QUALITY ASSURANCE:
The Contractor shall ensure that all materials, goods and workmanship are of the respective kinds and standards described in the Drawings and Specifications or instructions.

402 QUALITY CONTROL:
The Contractor shall institute procedures and maintain all necessary records to monitor and control the quality of all Works both on site and in the works. The Contractor shall maintain records of quality, test or opening up for inspection required. The Contractor shall make checks on materials and workmanship to confirm that the records kept are accurate and actually relate to the work being carried out. These records shall include:
- Identification of the element, item batch or lot, including location in the works.
- The nature and dates of inspections, tests and approvals.
- The nature and extent of any deficiencies.
- Details of corrective action.

404 VOUCHERS & CERTIFICATES:
The Contractor shall obtain upon request such vouchers and certificates as are necessary to prove that the materials and workmanship uses, comply.

406 RECORDS OF WEATHER:
The Contractor shall maintain records of weather and site conditions necessary for administration of the project and control of quality.

408 QAQC STAFF FOR OFF-SITE GOODS AND MANUFACTURE:
- The Contractor shall maintain an approved inspection organisation with a sufficient number of experienced and qualified staff as to ensure proper inspection and testing as necessary of all items which are manufactured or fabricated on or off the job site. If, in the opinion of the Employer, the Contractor is unable to demonstrate inspection and certification competence with in-house staff the Contractor shall employ an inspection and certification sub-contractor acceptable to the Employer to perform this function.
- The scope of Work for off job-site inspection and quality assurance certification shall include but is not limited to:
  - Inspection of premises proposed for the manufacture or fabrication of items referred to in the specification.
  - The carrying out or witness tests required under the Contract.
  - Inspection during fabrication and manufacture and independent auditing of the Contractor / Sub Contractor's QAQC procedures.
  - Inspection prior to shipment and certification that such items are in accordance with the specification and in good order.
- Certification made in accordance with 4) above shall not relieve the Contractor of any of his obligations under the Contract.

410 CO-ORDINATING OTHER SUB CONTRACTORS:
The Contractor / Sub Contractors shall co-ordinate and expedite all site works and co-ordinate all work sequences with other Sub-Contractors to allow the quality standard to be maintained.

412 SUPERVISION ON SITE:
The Contractor shall supervise the production of all site work, inspect all completed sections of work or trades prior to commencement of subsequent trades or work operations and ensure that they comply with the specifications and are within stated tolerances. He shall ensure the prompt replacement of defective work in accordance with the Specifications.

414 MAKING GOOD DAMAGE TO OTHER WORKS:
The Contractor shall make good or by set off, pay for any damage caused by them, to the works of other Sub Contractors or to the site facilities.

416 SNAGGING:

- The Contractor shall ensure that before any part or parts of the Works is offered for approval, full quality checking and snagging has been carried out.
- The Employer shall be provided with copies of the Contractor's snag sheets showing the defect and date remedies as well as any outstanding defects. If it becomes clear that the Contractor has not adequately snagged the Works himself then the Employer will abandon the inspection. The Employer will not prepare his own snag sheets.

418 PROPOSALS FOR RECTIFICATION OF DEFECTIVE WORK/MATERIALS:

- As soon as possible after any part(s) of the work or any materials or goods are known or appear to be not in accordance with the Contract, the Contractor shall submit proposals for opening up, inspection, testing, making good, adjustment of the Contract Sum, or removal and re-execution.
- The Contractor shall allow for the possibility that such proposals may be unacceptable and that he may issue contrary instructions. The Contractor shall inform the Employer when remedial works are complete.

420 MEASURES TO ESTABLISH ACCEPTABILITY:
Wherever inspection or testing shows that the work, materials or goods are not in accordance with the Contract and measures (eg. testing, opening up, experimental making good) are taken to help in establishing whether or not the work is acceptable, such measures:

- shall be at the expense of the Contractor, and
- shall not be considered as grounds for extension of time.

422 REMEDY OF DEFECTS:
The Contractor shall secure the prompt remedying of all defects after completion of their Works.

424 PROTECTION:
The Contractor shall regularly check the adequacy of protection of completed works and replace protection as necessary.

426 TESTING AUTHORITY SERVICES:
The Contractor shall provide quality control and testing authority services for all structurally related work requiring quality control monitoring as required by relevant codes and Building Regulations and in accordance with the Contract Documents.
He shall also provide quality control and testing authority services for all materials, goods, assemblies and other items manufactured or fabricated away from the job site. Particular attention is drawn to the requirement for proper inspection of materials prior to shipment to site.

428 TESTS REQUIRED:
The Contractor shall carry out appropriate tests on all prototypes and samples and in addition shall carry out the tests and inspections as directed, in a timely way to ensure that results are available prior to completion of the relevant design or work stage

430 QUALIFICATIONS OF TESTING AND INSPECTION AUTHORITIES:
Testing and Inspection Authorities shall be speciality companies with at least five years experience with work comparable to the work shown and specified, employing labour and supervisory personnel experienced in this type of work. Testing Authorities shall maintain and operate their own laboratory fully equipped to perform all tests required.

432 REPORTS:
The Contractor shall make frequent reports of all insp ...led out by the Testing and Inspection Authorities. These reports shall be comple ...l required information. Such reports shall be distributed weekly as directed.

434 CERTIFICATION:
The Contractor shall ensure that the Testing and Ins ...pletion of the work of each section, certify that the work has been performed i ...Contract Documents.

436 TEST CONDITIONS:
All products handled or cured during testing shall ...le standards or as otherwise called for in each Specification Section.

652 Flow.

STANDARD

BS 6375

TEST

no Thermal.

BUILDABILITY, DIMENSIONAL CO-ORDINATION, SETTING OUT, TOLERANCES AND MOVEMENTS

450 BUILDABILITY
The Contractor shall comment on specifications, drawings and details with particular regard to the practical implications, the economics and feasibility of the proposed forms of construction, selection of materials, sequence of construction, building systems, equipment and off site fabrications etc.

452 DIMENSIONAL CHECKS:
- Prior to the commencement of any Works, the Contractor shall check the dimensions and levels shown on drawings for compatibility with each other and with the site and work completed to date.
- The Contractor shall inform the Employer of any incompatibility within 14 days of receipt of drawings and seek instructions. The Contractor shall arrange for revised drawings to be prepared, indicating the changes necessary and submit them for review. The Contractor shall be responsible for the accuracy of all dimensions and levels relating to the Works as constructed.

454 DIMENSIONS:
The accuracy of dimensions scaled from the drawings is not guaranteed. The Contractor shall obtain any dimensions required but not given in figures on the drawings nor calculable from figures on the drawings. Where dimensions are required of the existing buildings and points related to existing buildings, the Contractor shall take all such dimensions/levels and provide copies to the Employer.

456 ORDERING OF MATERIALS:
The accuracy and sufficiency of the drawings is not guaranteed for purposes of ordering materials or constructing the work. The Contractor shall assume that all work at every location is not modular or repetitive and shall make due allowance by using components of varying sizes to suit the existing building.

458 ACCURACY OF INSTRUMENTS:
The Contractor shall use instruments and methods at least as accurate as described in BS5606, Section 5. In general, accuracy of setting out will need to be higher than this standard in order to meet the requirements of installation tolerances specified in the Contract documents. The Contractor shall submit details of methods and equipment to be used in setting out the Works prior to commencement on site.

460 TAKING MEASUREMENTS:
The Contractor shall take or cause to be taken in due time any measurements or surveys on site or off site as necessary for the design and manufacture and execution of the Contract. He shall check and co-ordinate the setting out of Sub Contracts.

462 APPEARANCE AND FIT:
The Contractor shall arrange the setting out, erection, juxtaposition of components and application of finishes to ensure that there is satisfactory fit at junctions, that there are no real or apparent changes in plane, line or level and that the finished work has a true and regular appearance. Wherever satisfactory accuracy, fit and/or appearance of the work are likely to be critical or difficult to achieve, the Contractor shall obtain approval of proposals or of the appearance of the relevant aspects of the partially finished work as early as possible.

464 TOLERANCES:
The Contractor shall advise and assist to ensure that design, selection of materials, fabrication and installation techniques are appropriate to meet the specified tolerances. He shall check the Works to ensure they meet with specified tolerances and report as necessary.

466 DETERMINING BUILDING MOVEMENTS DURING CONSTRUCTION:
The Contractor shall advise and agree the minimum practicable movement joints in regard to the building construction sequences required during and after the building process to be allowed in the design drawings or specifications included in the Contract.

468 ADVISING SUB CONTRACTORS ON MOVEMENTS AND SEQUENCES:
The Contractor shall advise and assist in ensuring that the design, selection of materials, fabrication and installation techniques are appropriate to allow for the specified movement allowances and sequence of construction.

470 CO-ORDINATING MOVEMENT SYSTEMS:
The Contractor shall ensure that movement allowances in different Sub Contract works are accommodated and that all other Sub Contractors are aware of movements allowed in adjacent works.

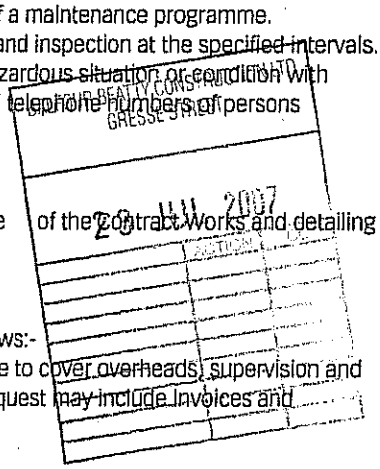
OPERATION & MAINTENANCE OF THE FINISHED BUILDING

500 HEALTH AND SAFETY REQUIREMENTS:
The Contractor shall design the works such that they can be safely used, maintained and cleaned in accordance with the Health & Safety at Work Act 1974 and the Construction , (Design and Management) Regulations 1994. Instructions shall be provided for the safe use, maintenance, cleaning and replacement of all aspects.

Any glazing incorporated in the works shall conform to the recommendations of BS: 6262: 1982 and CP 153: Part 1: 1969.

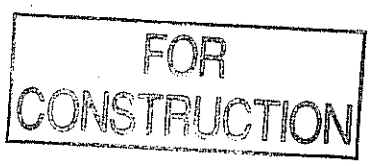
502 MAINTENANCE GENERALLY:
The design and installation of all works by shall allow for simple maintenance and for easy replacement of parts where necessary. The Contractor shall ensure that all materials and components that are anticipated to require replacement whether because of wear, deliberate or accidental damage, shall be readily available.

504 MAINTENANCE CONTRACT:
- Contractors shall at the request of the Employer and upon the satisfactory completion their Works enter into a Maintenance Contract with the Employer for the periodical inspection, cleaning, testing, maintenance and repair of the whole of the Contract or such part as the Employer shall from time to time direct.
- The Contractor shall therefore submit a draft of the above Maintenance Contract which shall include terms and conditions to the following effect:-
  - At the Employer's option the Maintenance Contract shall last for 20 years commencing at the end of the period of maintenance. The Employer may terminate the contract upon giving three months notice of his intention so to do.
  - The Contract may be assigned by the Contractor but only with the consent of the Employer who must be satisfied as to the competence of the assignee.
  - The provision of skilled personnel fully conversant with the Contract and competent to attend the same.
  - Provision, subject to agreement with the modification by the Employer, of a maintenance programme.
  - Attendance upon the Contract Works for the purpose of routine cleaning and inspection at the specified intervals.
  - Immediate attendance by day or night upon notification of breakage or hazardous situation or condition with respect to the Contract Works. The Contractor shall supply the names and telephone numbers of persons competent and authorised to act upon such notification.
  - The supply of all spare parts and other necessary materials.
  - The supply of all necessary staging, tools, instruments etc.
  - The monthly submissions to the Employer of a log reporting upon the state of the Contract Works and detailing work done, spares and materials used and labour employed.



506 MAINTENANCE CONTRACT CHARGES:
- The charges for the Maintenance Contract service shall be calculated as follows:-
  a) Spare parts and materials shall be supplied at cost plus * percent surcharge to cover overheads, supervision and profit. Costs shall be suitably evidenced in writing which at the Employer's request may include invoices and shipping documents.
  (* Percentage to be provided by Works Contractor)
  b) Labour shall be supplied at hourly rates specified as follows:

	Rate per hour		
	Year 1	Year 2	Year 3
Senior Fitter:			
Trained Fitter:			
Improver:			



- The submission of the Maintenance Contract shall be accompanied by a separate quotation for the supply of all necessary equipment required to maintain the Contract Works within the specification, so that the Employer may use his own staff to carry out this work should he be unwilling to enter into a Maintenance Contract.

BUILDING SERVICES

510 DESIGN AND INSTALLATION
- The requirements of this specification will be the overriding criteria for building services design and installation.

- Unless where specifically approved by the Employer, the building services installations shall be concealed except in areas allocated on the architects drawings and in any case be limited to:
  - plant rooms/areas
  - designated ducts
  - services risers
  - below ground
  - concealed conduits and trunkings
- Where approval for exposed services is sought, co-ordinated drawings, schedules, samples etc shall be submitted for the CA's approval.

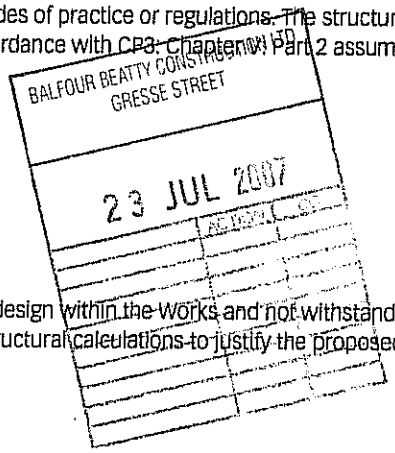
STRUCTURE & STRUCTURAL SUPPORT

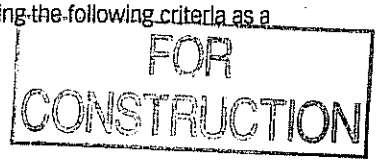
520 STRUCTURAL SUPPORT:

- The Contractor shall be responsible for ascertaining all precise characteristics of the adjacent structure and any provision of structural support to the Contractors' Works. This information shall be gained from drawings issued with the Contract, drawings issued during the Contract and from site investigation.
  Where relevant, the Contractor / Sub Contractors shall specify the dead load of their installed systems on their design drawings. This shall be expressed as the weight in kg/m2.
- The Contractor / Sub Contractors shall allow for all fixings necessary to support the Works.
  The Contractor shall ensure that any structure provided, allowing for all tolerances and deflections, is of acceptable rigidity and strength and that it will be possible to connect his Works satisfactorily to the supporting framework. The Contractor shall verify this at tender and every other stage.

522 STRUCTURAL LOADINGS:

- The Contractor shall be responsible for ascertaining and allowing for all dead and live loads imposed on the Works. These loads include incidental impact or other loads likely to arise during the use and maintenance of the building. The Contractor / Sub Contractors shall show on their design drawings the detailed provisions they have made to allow for this.
- The Works shall be designed to withstand wind loading where applicable. It shall be the Contractor's responsibility to determine the wind loading and value in accordance with the geographical location of the site, the topographical conditions and the proposed building as determined by site investigations and calculations in accordance with CP3: Chapter V: Part 2 and other relevant codes of practice or regulations. The structural design of the structural components is to be carried out in accordance with CP3: Chapter V: Part 2 assuming the following criteria as a minimum:-
  Basic Wind Speed (V): 40m/s-1
  Topography Factor (S1): 1.0
  Ground Roughness Category
  Cladding & Building Size (S2): S2A.
  Factor (S3): 1.0





523 CALCULATIONS:
Where there are elements of structural design within the Works and not withstanding any requirements of the Local Authority, the Contractor shall supply structural calculations to justify the proposed system.

524 DEFLECTIONS:

- The Works comprising elements of structure as well as architectural elements shall not be subject to substantial deflections under load, unless otherwise stated.
  The maximum allowable deflection of any element of the Works when carrying full design load shall not exceed 1/250 of its clear span in a direction normal to the plan of that element or 3mm whichever is the least.
- The Works shall not deflect under loading in any way that is detrimental to any element of the Works or adjacent structural or building elements.
- All components, couplings and fixings shall be designed and installed in such a manner as to be capable of accommodating all of the above deflection without distortion, deformation or failure.
- The Works shall be designed to accommodate differential structural movements arising from any load imposed on them and surrounding construction.

TOLERANCES:

540 OVERALL TOLERANCES:
Tolerances stated below in 'Tolerances After Installation' specify the worst combination of tolerances permissible however they have arisen (eg. whether as a result of setting out, fabrication or installation).
Tolerances relating to the building structure are defined in the structural engineer's specification, the overriding criteria will be that of the requirements of tolerances in relation to adjoining and following work.
The Contractor shall work within the tolerances agreed and no revisions to the tolerances to cater for inadequate control by the Contractor will be permitted.

542 ALTERNATIVE TOLERANCES:
Alternative tolerances to those specified may be permitted at the Employer's discretion provided they are submitted at tender stage and approved.

544 MONITORING & CONTROL OF TOLERANCES:
Full details shall be submitted for comment on the Contractor's proposed methods for achieving and constantly monitoring the tolerances during all stages of the Works. The Contractor shall provide personnel, equipment and instruments necessary to effectively control tolerances. Detailed records of the constant control and tolerances achieved shall be submitted.

546 TEMPERATURE OF RECORDING:
For recording purposes a reference temperature for measurements shall be established, preferably the mean value over the period of the construction. The accuracy of recording shall be plus or minus 0.25oC.

548 MODULARITY:
The setting out generally shall be taken from grid-lines as indicated on the drawings. Positions and tolerances for all elements of new construction shall be related to these grids or any other co-ordinating modules derived from the grid lines as shown on the Contract drawings.

550 CONFLICTING TOLERANCES:
Where two or more different tolerances can be derived by calculation or from the drawings for the same dimension, the most onerous tolerance (as directed) shall apply. Tolerances shall not be cumulative.

552 ACCUMULATION OF TOLERANCES:
Sufficient allowance shall be provided at each junction within the works so that each element is located accurately without tolerances accumulating.

554 FIT:
The Works, when installed shall not be subject to warping or twisting, shall be sturdy, rigid, firm, free from vibration, knocking, rattles, squeaks and other noises when subject to the worst combination of environmental conditions and wind loads.

556 ACCOMMODATING OTHER TOLERANCES:
All controlling dimensions, especially at the interface with surrounding elements, construction and structure, shall be observed. All dimensions shall be checked on site as necessary by the Contractor and account taken of all deviations before any work is put in hand. The design of the Works including interfaces and fixings to adjacent elements shall allow for the tolerances of the adjacent installation, which shall be determined by the the Contractor / Sub Contractors.

558 ERECTION SEQUENCE:
The Contractor shall allow for sufficient analysis and reorganisation of the erection sequence to satisfy himself and the Employer that the specified tolerances after installation will be met.

560 TOLERANCES ON DRAWINGS:
All tolerances shall be clearly shown on the Contractor's drawings.
The Contractors shall also state and show on their drawings the dimensional and detail provisions intended to accommodate the tolerances of the surrounding elements as necessary to ensure that all aspects of the specialist Works relate satisfactorily to the project as a whole.

562 MANUFACTURING TOLERANCES:
- The Contractor shall submit with his tender a detailed list of tolerances to which their Works will be fabricated to show that they can meet the overall requirements of this Specification in relation to permitted tolerances after installation. As a minimum the Contractor's statement of tolerances shall include the following:
  - Length

- Width
- Height
- Diagonal Dimension
- Thickness
- Flatness Normal to Plane
- Out-of-Plan
- Eccentricity
- Inclination
- Out-of-Roundness

- In the absence of any submitted tolerances, the following shall apply:-
The length, width, height, diagonal dimension, thickness or flatness of any element or component of the works shall not deviate from stated dimension by more than 0.1% of that dimension subject to a maximum of +1.0mm.

564 TOLERANCES AFTER INSTALLATION:
The Works shall be erected plumb and true, in proper alignment and relation to established lines and grades as shown on the fabrication and erection drawings.
Unless otherwise specified, the following are the maximum tolerances of any part of the system as measured after installation at handover of the Works (under dead load) only:-

1. Plan: The maximum deviation on plan of the position of any element from given datum shall be 0.1% over any distance subject to a maximum of +3mm.
2. Level: The maximum deviation of level of the position of any element in relation to a given level shall be 0.1% over any distance subject to a maximum of +3mm.
3. Line/Plumb: The maximum deviation of any element from line or from plumb shall be 0.1% over any distance subject to a maximum of +3mm.
4. Flatness: The maximum deviation from flatness and angular twist of any element measured in any direction, measured against a straight edge, shall be 0.1% over any distance measured in any direction subject to a maximum of +3mm.
5. Offset: The maximum offset (ie. gap) in plan, or section of any two abutting components shall be 1mm. The maximum tolerance in an expressed joint or groove shall be +1mm.

PROVISION FOR MOVEMENT:

600 GENERAL PROVISIONS FOR MOVEMENT:
The Contractor shall design all support required for the Works and fixings and interfaces to related elements to ensure that the effects of the worst possible combinations of all movements does not adversely affect the performance of any part of the works. Allowance shall be made for lateral movement, superimposed loads, dead loads, thermal expansion and contraction, deflection from exterior forces, torsional loads, traffic vibration and wind loads both positive and negative and all other relevant forces.

602 EXPANSION & CONTRACTION:

- The Works shall be designed to provide for such expansion and contraction of component materials as will be caused by the worst combination of environmental conditions (eg. sunlight, temperature, humidity, rain, pressure etc) during and after construction, without causing buckling, stresses, failure of joint seals, undue stress of structural elements, damaging loads on fasteners, reduction of performance or other detrimental effects.
- All components shall be designed for thermal movement resulting from a surface temperature differential of 90°C (-15°C to 75°C). A minimum internal temperature of -5°C should be assumed in the design. The effects of direct sunlight and thermal shock shall also be taken into account.

604 CONSTRUCTIONAL MOVEMENT:

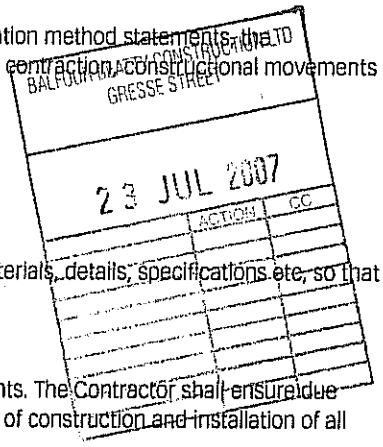
- Constructional movement is defined as the movements of the elements of building during the period of construction caused by the imposition or removal of dead loads comprising the building elements themselves or building equipment and machinery.
- The Contractors shall ensure that the design and method of installation of the Works fully accommodates any constructional movements that occur during the period of installation.

606 MOVEMENT AFTER INSTALLATION:
The main superstructure moves as a result of live loads and wind loads. The Contractor shall take full account of these movements in the design and installation of the systems, paying special attention to the boundaries with different elements.

608 ACCOMMODATING MOVEMENT IN ADJACENT ELEMENTS:

The design of the Works including interfaces and fixings shall accommodate structural deflections and movements (including thermal movement) in adjacent building elements. The Contractor shall be responsible for ascertaining the extent of such movements/deflections.

610 PROVISIONS FOR MOVEMENT SHOWN ON DRAWINGS:
The Contractor shall state and show on the fabrication drawings and installation method statements the dimensional and detail provisions intended to accommodate expansion and contraction, constructional movements and movements after installation.



BOUNDARY CONDITIONS

620 KNOWLEDGE OF ADJACENT CONSTRUCTION:
The Contractor shall be fully acquainted with all adjoining constructions, materials, details, specifications etc, so that the design of each Trade Contract fully relates to the project as a whole.

622 SUPPORTS & SEALS TO ADJOINING CONDITIONS:
The adjoining conditions in many cases generate special support requirements. The Contractor shall ensure due allowance is made in the design for the number, type, detail design, method of construction and installation of all cleats, closures, seals and supports at boundary elements.

FIRE PERFORMANCE

630 GENERAL FIRE PERFORMANCE REQUIREMENTS:
The installation shall comply with all relevant parts of BS 476, BS 5588, 2782, The Building Regulations and the requirements of the local fire authority in relation to fire performance.

632 SPECIFIC REQUIREMENTS FOR FIRE PROTECTION:
Where indicated on drawings or elsewhere in the specification, the Works shall be required to achieve at least the following fire performances when tested in accordance with the following standards (evidence of compliance with test will be required):-

1. External Fire Exposure Roof Test: BS 476: Part 3.
2. Non Combustibility Test for Materials: BS 476: Part 4
3. Ignitability Test: BS 476: Part 5
4. Fire Propagation Test: BS 476: Part 6
5. Surface Spread of Flame Test: BS 476: Part 7.
6. Fire Resistance of Elements of Building Construction: BS 476: Part 8
   Stability
   Integrity
   Insulation

634 TOXICITY:
Materials employed in the Works shall be selected such that any product of combustion shall be no more than one order more toxic than the products of combustion of wood when burned under similar conditions. Alternatively they shall be not toxic to the extent which greatly aggravates the harm caused by fire.

WEATHER RESISTANCE:

650 GENERAL WEATHER RESISTANCE:
The Works shall be designed to withstand and seal the building against weather conditions based on the worst event in a 50 year return period (from Meteorological Office data), taking account of extremes of wind, temperature, solar radiation, frost, snow, rain, hail and any other relevant factors, having regard to the location of the works. This shall apply to all joints within any element of the Works and also to joints and junctions between one element of Works and that of others.

652 OTHER REQUIREMENTS FOR WEATHER RESISTANCE:
The Works shall provide the following performance:-

1. Resistance to water penetration when tested in accordance with BS 5368: Part 2: 1980 shall be in the test pressure of '300 Pa' as defined in BS 6375: Part 1: 1989: Table 2: Watertightness.
2. Resistance to air infiltration when tested in accordance with BS 5368: Part 1: 1976 shall be in the test pressure class of '600 Pa' as defined in BS 6375: Part 1: 1989: Table 1: Air Permeability.
3. Resistance to water penetration tested in accordance with AAMA 501.1. 1983
4. Resistance to water penetration of as-installed works tested in accordance with AAMA 501.2.1983. A minimum of 10% of the finished works shall be tested. The area of to be tested will be designated by the Employer. Should any part of the designated area fail, 100% testing shall be applied.
5. Resistance to wind pressures calculated in accordance with BS CP3, Chapter V, Part 2 with maximum deflection of framing members span/250.
6. Resistance to air permeability when tested in accordance with BS 5368, Parts 1&3 for windows.

654 WEATHER TESTING:
Testing to ensure conformity shall be carried out by Taywood Engineering or equal approved test facility in accordance with the Taywood Test Procedure. If Test Certificates are available for identical details then these may be accepted instead.

ACOUSTIC REQUIREMENTS

700 GENERAL REQUIREMENTS:
All works shall be designed to comply with the requirements of the Building Regulations. The Contractor shall provide evidence in the form of drawings and calculations to demonstrate compliance of the Works.

702 SOUND REDUCTION:
For elements that enclose, the Contractor shall state sound reduction factor of the complete construction in dB over a frequency range of 100 to 3250 Hz. In addition the Contractors may be required to provide a report from a recognised sound test laboratory which will give an indication of the transmission of airborne sound performance of the system where relevant.

704 SOUND TRANSMISSION:
The requirements relate to vibration, knocking, rattles, squeaks and other noises when the Works are subject to wind pressure.
In addition, all works shall be designed so as to minimise noise generation when in use. Thus they shall open quietly on self lubricating gear. The Works shall be properly seated so as to prevent drumming or vibration when walked upon and electro-mechanical elements shall be provided with sufficient isolation so as to cause minimum disturbance when in motion.

CORROSION, ROT RESISTANCE, TOXIC MATERIALS & PESTS

750 CORROSION:
- The Works shall be constructed of materials used in such manner that they shall be resistant to corrosion, particularly bi-metallic corrosion, galvanic action, distortion, swelling or rot resulting from the presence of moisture, air and differing external corrosion or corrosion from solar radiation, snow, hail, ice, rain, contaminators (eg. oxides of nitrogen and sulphur), dust or plants.
- The Contractors shall refer to PD 6484 1979 in formulating the design.

752 ORGANIC DETERIORATION & PESTS:
The Contractors shall take special care in the design, choice of materials and installation to prevent the growth of fungi and micro-organisms and the attach or infestation of the works by insects, animals and birds. The Contractor shall ensure that preventative measures have been taken to ensure resistance to such attack. The resistance to the above will be tested in accordance with BS 1982: 1986.

754 TOXIC MATERIALS & POLLUTION:
The works shall not contain any toxic materials which by physical contact or by inhalation of gases could prove harmful to the occupants of the building. The materials used in the system shall not give off any odours. The Works shall not give off dust or contaminants which are likely to be harmful to personnel or equipment.

756 REPORTING:
At least 21 days prior to ordering/manufacture/fabrication, the Contractor shall submit for approval a written analysis for each section of the works in consideration of each of the above matters.

REQUIRED LIFE & MAINTENANCE

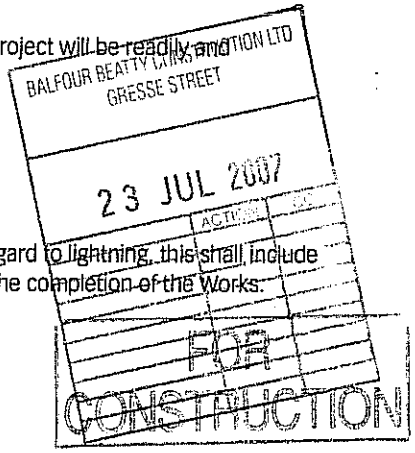
800 LIFESPAN:
It is intended that this should be a long-life building as described in BS 7543. The entire system shall be designed for a life of at least 50 years, excepting mechanical and electrical parts that shall have a 25 year life. The Contractor shall state the maintenance requirements of all the Works and shall ensure that they are designed to require only corrective maintenance under normal use. The Works shall maintain a satisfactory and clean visual appearance throughout their life when maintained and cleaned in accordance with the Contractor's recommendations together with those of BS 8210:1986 using normal accepted methods.

802 EASY REPLACEMENT OF PARTS:
The Works shall be installed so that parts can be replaced, if damaged, without disturbance or damage to other elements of construction or finishes.

804 PROTECTIVE FINISHES:
All parts of the system shall be installed free of rust, corrosion, rot or any form of deterioration and shall be suitably finished to prevent such deterioration. The Contractor shall state on their drawings the type and standard of protective finishes to be used.

806 STAINING:
The Contractor shall ensure that his Works are free from pattern-staining for any reason. He shall also ensure that his system does not cause staining on any adjoining elements of cladding or construction.

808 AVAILABILITY OF SPARES:
The Contractor shall warrant that replacement of all materials used within the project will be readily and economically available for at least 12 years from completion of the project.



ELECTRICAL REQUIREMENTS

820 LIGHTNING PROTECTION:
The Contractor shall make provision for protecting all parts of the works with regard to lightning, this shall include unobstructed fixing points that shall be easily accessible but fully concealed at the completion of the Works. Lightning protection shall be in accordance with BS 6651.

ENVIRONMENT & THERMAL PROPERTIES

840 'U' VALUES:
The Contractor shall achieve compliance with the Building Regulations 2000: Approved Document L2/A current at June 2006

842 THERMAL BRIDGING:
The design shall take particular precautions to prevent thermal bridging between the inside and outside and avoid local areas of construction with a significantly different temperature on the inner face.

844 VAPOUR INSULATION:
The Works shall be designed to resist the passage of moisture from the inside of the building in the form of water vapour, to prevent the rise of condensation on the inner surface or interstitial condensation within the construction itself. The Trade Contractor shall allow for all necessary vapour barriers, seals and ventilation to prevent internal or interstitial condensation. Alternatively, provision shall be made for drainage of condensation to prevent damage to the Works.

850 PREDICTED ENVIRONMENT:
The Contractor shall take into account the predicted environmental conditions within the building during normal running conditions shall be provided by the Trade Contractor to enable them to take proper measures in their design.

END

A75 SAMPLES, MOCK UPS AND PROTOTYPES

To be read with preliminaries/General Conditions.

100 The samples detailed in this section and the following sections are defined as requiring the CA's approval. Acceptability of variance in quality for whatever reason shall be at the CA's discretion.

205 BRICK/BLOCK WALLING (F10)
- Common brickwork and blockwork (F30): Representative samples of each brick, block and mortar. 1No reference panels of each type of walling forming part of the works; full height x 2100mm long.

210 ACCESSORIES/SUNDRY ITEMS FOR BRICK/BLOCK/STONE WALLING (F30)
- 3No of each item

215 CARPENTRY/TIMBER FRAMING/FIRST FIXING (G20)
- Samples of 3D sections to be 600mm long.
  Samples of 2D sections (boards) to be 600mm x 600mm x thickness.

235 METAL PROFILED/FLAT SHEET CLADDING/COVERING (H31)
- Generally:
  5No 100mm x 100mm x thickness - different RAL colours.
  2No 600mm x 600mm x thickness - different RAL colours.
  One sample of each junction (length to length, external corner, internal corner) painted in accordance with specification.
  Samples to be painted in a range of different RAL colours

240 NATURAL STONE SLAB CLADDING/LINING /FEATURES (H51)
- Granite reception desk countertop (clause 110):
  Provide 3No. 300 x 300mm x thickness samples of stone tile showing different colour variations and surface finish.

245 INVERTED ROOF COVERING (J31)
- Stone ballast (clause 365): Submit representative sample, prepare sample areas as detailed below.
  Pavings (clause 370): 5No slabs of different colour/finish for each type of slab, prepare sample area as detailed below.
- Sample area:
- In location approved by the CA (sample not to form part of the works) construct a sample area 2400mm x 2400mm approximately.
- Sample area to include:
  Area of paving slabs supported on specified support system.
  Perimeter zone (300mm wide) of stone ballast.
  Filter layer.
  Insulation.
  Roofing membrane.
- Reference area: Complete area of the finished work in approved location(s) as required by CA and obtain approval of appearance before proceeding.

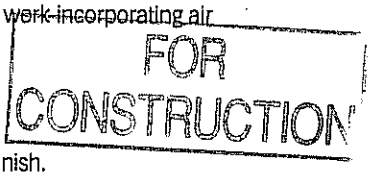
250 WARM ROOF COVERING (J42)
- Stone ballast (clause 365): Submit representative sample, prepare sample areas as detailed below.
  Walkway tiles (clause 485): 4No tiles of each different colour/finish, prepare sample area as detailed below.
- Sample areas:
- In location approved by the CA (sample not to form part of the works) construct a sample area 3600mm x 2400mm approximately, divided into two areas to show each type of roofing condition.
- Sample area to include:
  1200 x 1200mm area of membrane walkway tiles.
  1200 x 1200mm area of stone ballast.
  2400mm x 2400mm area of visible waterproof membrane.
  Vapour control layer.
  Filter layer.
  Insulation.
  Roofing membrane.
- Sample area to be formed onto a base inclined at 1:40.

- Reference area: Complete area of the finished work in approved location(s) as required by CA and obtain approval of appearance before proceeding.

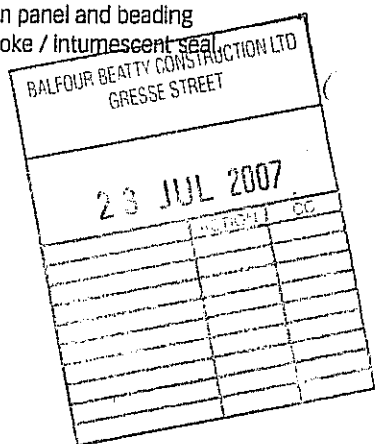
255 PLASTERBOARD DRY LINING/PARTITIONS/CEILINGS (K10)
- For each type of construction provide 900mm x 900mm x thickness sample panel.
- Provide representative samples of perimeter conditions, access panels, all materials and components including sample assembly of framing/grid/support systems.
- Mock ups of junctions between ceilings and adjoining elements showing at least a 900mm length of the junction.
- Mock ups of ceiling panels incorporating fittings to the ceilings by others.
- Provide a sample panel approx size 6000 x 6000mm at high level first floor (2nd floor slab) for the core areas in advance of the remainder of the works and in accordance with the requirements for the prototype described above, upon full and final approval the sample will be designated as the 'reference panel' for the remainder of the works and shall be the benchmark establishing the minimum acceptable standards for all following works.
- Refer to services engineer's specifications.

260 PROTOTYPE OFFICE FLOOR CORE WALL PANELLING (K13)
- Drawing reference: A2130, A4013 and A5115
- Provide fully finished prototype(s) 2100mm o/a wide x full height section of MDF flat wall panelling and full width x full height section of MDF curved wall panelling, to include:
  - 1no. 1000mm wide MDF wall panel
  - Lobby door frame and door leaf (applies to flat panel only).
  - Skirting.
- Complete control sample(s) in advance of the main panelling works in 1 location forming part of the finished work

280 RAISED ACCESS FLOORS (K41)
- Provide a 6000 x 6000mm panel of raised floor construction
- Complete control sample in 1 location of 2000mm x 2000mm forming part of the finished work incorporating air supply grilles, perimeter trench heater grille and perimeter conditions.



295 DOORS/SHUTTERS/HATCHES (L20)
- For all types of components provide:
  Panel (2D) components - 3No 300mm x 300mm sample panels each showing a different finish.
  Section (3D) components - 3No 300mm long sample each showing a different finish.
  3No x 300mm lengths of typical frame sections each painted in different colours.
  300x300mm sample of each type of corner junction
  1No sample of each type of component for incorporation into the works upon approval.
- Stainless steel clad door, drawing reference A4201, provide:
  600 x 600mm sample of door leaf including door lipping, smoke / intumescent seal, vision panel and beading
  300 x 300mm sample of door frame including frame head / jamb corner junction and smoke / intumescent seal



300 STAIRS/GALLERIES/BALUSTRADES (L30)
- 5No x 600mm lengths of all sections each finished in different colours/textures.
- 600x600mm sample of each type of corner junction
- 600mm x 600mm x thickness samples of glazing components.
- Samples of all fixing, connection and fastening devices
- 1No sample of each type of component for incorporation into the works upon approval.
- Escape stair balustrade, drawing reference A3010, A3011, A3012, provide:
  Full height x 300mm sample of balustrade including:
  1No. baluster
  300mm length of handrail
  300mm length of mid rails
  Connection to stair stringer
- 1No. stair flight to be offered insitu in advance as a control sample prior to proceeding with full balustrade installation.

305 GENERAL GLAZING (L40)
- Where not specified elsewhere provide 900mm x 900mm x thickness samples of glass and glass units.

310 STONE/CONCRETE/QUARRY/CERAMIC TILING/MOSAIC (M40)
- Marble tiling to reception area, basalt tiling to WCs and mosaic tiling to showers.
- For each type of tiling/mosaic provide:
  3No 300 x 300mm x thickness samples of pavings showing different colour variations, edge treatment, surface finish

- Provide 1No 900mm x 900mm sample panel mounted on plywood backing showing tile type, finish, skirting, joint treatment including sample lengths of movement joints, thresholds and trims.
- 1No full tile of each type of material, where there is a variance in quality, appearance and size, etc of the materials, submit sufficient samples to enable the acceptable extent of variance to be established.
  Complete control sample areas in 1 location of 2000mm x 2000mm for each type of material, forming part of the finished work incorporating perimeter conditions.

400 RUBBER/PLASTICS/CORK/LINO/CARPET/TILING/SHEETING (M50)
- In addition to on-site samples specified in section M50, provide related samples of all trims, skirtings, accessories etc.
- Complete control sample to one stair flight and landing forming part of the finished work incorporating perimeter conditions and threshold details

405 PAINTING/CLEAR FINISHING (M60 & M61)
- For each type of coating and location/application provide:
  5No 300 x 300mm colour samples onto appropriate backing.
  2No 900 x 900mm samples in selected colour/finish onto actual base material (for 3D sections provide 900mm length of each typical section). Finish to be applied using specified methods.

410 UNFRAMED ISOLATED TRIMS/SKIRTINGS/SUNDRY ITEMS (P20)
- Provide 600mm lengths of all items unfinished.
  Provide 600mm lengths of all items finished in accordance with the specification.

411 PROTOTYPE EXTRACT GRILLE PANEL (P20)
- Drawing reference: A2130, A4218 and A4219.
- Provide fully finished prototype(s) full height x full width section of flat linear bar grille and curved linear bar grille, to include:
  - 1no. 1000mm wide MDF wall cladding panel either side.
  - Sub-frame.
  - Skirting.
- Complete control sample(s) in advance of the main panelling works in 1 location forming part of the finished work

415 FIXTURES/FURNITURE/EQUIPMENT (N10)
- 1No sample of each specified item
- Door mats (clause 300):
  Provide 5No x 300mm x 300mm pieces in different colours.
  Provide 1No x 600mm x 900mm selected colour.
- Reception desk, drawing reference A3501:
  Provide 600 x 600mm samples of key junctions utilising actual materials including:
  - Desk top / front panel junction.
  - Desk front panel / base junction.

417 SANITARY APPLIANCES (N13)
- Provide 1No sample of all appliances, fixtures, fittings etc, for incorporation into the works upon approval.

419 SIGNS/NOTICES (N15)
- Provide 1No sample of all proprietary items
- Provide 3No prototypes of each type of custom designed sign
- Provide mock up of tenants directory board

420 UNFRAMED ISOLATED TRIMS/SKIRTINGS/SUNDRY ITEMS (P20)
- Provide 600mm lengths of all items unfinished.
  Provide 600mm lengths of all items finished in accordance with the specification.

425 SLAB/BRICK/SETT/COBBLE PAVING (Q25)
- External granite sett paving: for each type of paving:
- Provide 3No 300 x 300mm x thickness samples of pavings showing different colour variations, edge treatment, surface finish
- Provide 2No 1000mm x 1000mm sample panels showing paving, finish, joint treatment including sample lengths of movement joints and thresholds
- Complete control samples areas in 1 location 1800 x 1200mm forming part of the finished work incorporating perimeter / interface conditions

500 PROTOTYPE WC(S) (N13)

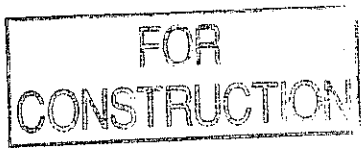
- Drawing reference: A2140, A2145, A2150 and A2151.
- Construct a prototype of 1No WC.
- Submit to the CA a detailed written statement within 8 weeks from the commencement of the works proposing the location of the prototype and the reasoning therein:
- The prototypes are intended to actually represent the completed areas. The completed prototype will function in every way and will be fully fitted out and decorated. With regard to ME&P services localised provisions can be made, however, all services are to function in every respect and in accordance with the specifications, and shall utilise all holes, chases, penetrations and services routings proposed for the completed work. These requirements will also apply if pre-fabricated WC units are used. Access is required by the Employer and other persons from time to time during normal working hours as directed by the CA.
- If as a result of constructing the prototype(s) the specification is varied, for whatever reason, for the construction of the remaining WC's, the prototypes are to be modified accordingly as instructed by the CA.
- When instructed by the CA the contractor shall remove the prototypes.

520 SAMPLE FEATURE WALL TO OFFICE RECEPTION (H41)

- Drawing reference: A2120, A2125 and A3115.
  Provide a fully finished 1000 x 1000mm sample section of profiled GRP wall cladding, (complete with paint finish and stainless steel insert strips) comprising:
  - 50% area of panel solid.
  - 50% area of panel to incorporate air extract linear slot detail.

525 SAMPLE LIFT CAR PANEL

- Drawing reference: A3105, A3110.
  Provide a 1000 x 1000mm sample panel of lift car finishes including:
  - Skirting
  - Profiled rubber coated wall cladding
  - Stop ends to rubber clad profiles
  - Stainless steel edging strips
  - Handrail
  - Acrylic soffit
  - Stone floor.

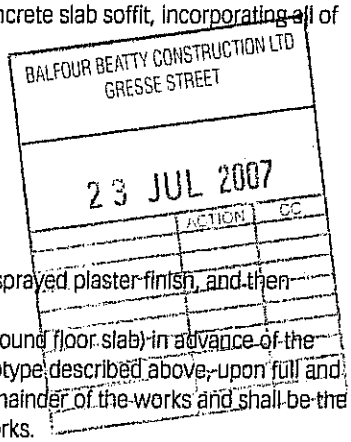


530 PROTOTYPE CONCRETE SOFFIT

Provide a prototype panel minimum size 2000 x 2000mm, representing the concrete slab soffit, incorporating all of the features required in the finished building including:

- 2000mm / 3000mm length of fully functioning lighting track.
- 1no. fully functioning track-mounted office luminaire and connection piece.
- 1no. fully functioning recessed office luminaire.
- 1no. fully functioning recessed reception luminaire.
- 1no. fire detector / sounder unit.
- fully functioning lighting control system connected to luminaries.

Prototype is to be constructed insitu in advance at basement level.
The prototype shall be presented firstly in a complete state with an unpainted sprayed plaster finish, and then dismantled, surface painted, reassembled and re-presented.



- Provide a sample panel approx size 4500 x 4500mm, at high level basement (ground floor slab) in advance of the remainder of the works and in accordance with the requiremenrts for the prototype described above, upon full and final approval the sample will be designated as the 'reference panel' for the remainder of the works and shall be the benchmark establishing the minimum acceptable standards for all following works.
- Refer to structural engineer's specifications.

END

G20 CARPENTRY/ TIMBER FRAMING/ FIRST FIXING

To be read with Preliminaries/ General conditions.

TYPES OF TIMBER

270 UNGRADED SOFTWOOD
- Quality of timber: Free from decay, insect attack (except pinhole borers) and with no knots wider than half the width of the section.
- Surface finish: Regularized.
- Treatment: As NBS section Z12 and British Wood Preserving and Damp-proofing Association Commodity Specification C8.
  - Type/desired service life: OS (organic solvent) 60 years.
- Moisture content at time of erection: As clause 450.

275 WROT TIMBER
- Standard: To BS 1186-3.
  - Class: CSH.
- Treatment: As NBS section Z12 and British Wood Preserving and Damp-proofing Association Commodity Specification C8.
  - Type/desired service life: OS (organic solvent) 60 years.
- Moisture content at time of fixing: 13 to 19%.

311 PLYWOOD FOR NONSTRUCTURAL APPLICATIONS
- Standard: To an approved national standard.
- Thickness: As indicated on the drawings.
- Appearance class to BS EN 635: Class E.
- Bond quality to BS EN 314-2: Class 3.
- Finish: Sanded.
- Treatment: Fire retardant impregnation as NBS section Z12 and British Wood Preserving and Damp-proofing Association Commodity Specification FR4 Type B, unless specified otherwise.
  - Type/desired service life: OS (organic solvent) compatible with fire retardant treatment, 60 years.

WORKMANSHIP GENERALLY

402 CROSS SECTION DIMENSIONS OF NONSTRUCTURAL SOFTWOOD TIMBER
- Dimensions: Dimensions in this specification and shown on drawings are finished sizes.
- Maximum permitted deviations from finished sizes: As stated in BS EN 1313-1:
  - Clause 6 for sawn sections.
  - Clause NA.2 for further processed sections.

403 CROSS SECTION DIMENSIONS OF NONSTRUCTURAL HARDWOOD TIMBER
- Dimensions: Dimensions in this specification and shown on drawings are finished sizes.
- Maximum permitted deviations from finished sizes: As stated in BS EN 1313-2:
  - Clause 6 for sawn sections.
  - Clause NA.3 for further processed sections.

420 WARPING OF TIMBER
- Bow, spring, twist and cup: Not greater than the limits set down in BS 4978 or BS EN 519 for softwood, or BS 5756 for hardwood.

430 SELECTION AND USE OF TIMBER
- Timber members damaged, crushed or split beyond the limits permitted by their grading: Do not use.
- Notches and holes: Position in relation to knots or other defects such that the strength of members will not be reduced.
- Scarf joints, finger joints and splice plates: Do not use without approval.

440 PROCESSING TREATED TIMBER
- Cutting and machining: As much as possible before treatment.
- Extensively processed timber: Retreat timber sawn lengthways, thicknessed, planed, ploughed, etc.

- Surfaces exposed by minor cutting and/ or drilling: Treat with two flood coats of a solution recommended by main treatment solution manufacturer.

450 MOISTURE CONTENT
- Moisture content of timber and wood based products at time of installation: Not more than:
  - Covered in generally unheated spaces: 24%.
  - Covered in generally heated spaces: 20%.
  - Internal in continuously heated spaces: 20%.

451 MOISTURE CONTENT TESTING
- Procedure: When instructed by the CA, test timber sections with an approved electrical moisture meter, used in accordance with the manufacturer's recommendations.
- Test sample: Test 5% but not less than 10 lengths of each cross-section in the centre of the length.
- Test results: 90% of values obtained to be within the specified range. Provide the CA with records of all tests.

510 PROTECTION
- Generally: Keep timber dry and do not overstress, distort or disfigure sections or components during transit, storage, lifting, erection or fixing.
- Timber and components: Store under cover, clear of the ground and with good ventilation. Support on regularly spaced, level bearers on a dry, firm base. Open pile to ensure free movement of air through the stack.
- Trussed rafters: Keep vertical during handling and storage.

520 EXPOSED END GRAIN
- Components: Seal exposed end grain of the following before delivery to site.

530 PAINTED FINISHES
- Structural timber to be painted: Primed as specified before delivery to site.

540 CLEAR FINISHES
- Structural timber to be clear finished: Keep clean and apply first coat of specified finish before delivery to site.

550 EXPOSED TIMBER
- Planed structural timber exposed to view in completed work: Prevent damage to and marking of surfaces and arrises.

JOINTING TIMBER

570 JOINTING/ FIXING GENERALLY
- Generally: Where not specified precisely, select methods of jointing and fixing and types, sizes and spacings of fasteners in compliance with section Z20. Fasteners to comply with relevant British Standards.

580 FRAMING ANCHORS, PLATES ETC.
- Material/ finish: Galvanized steel.
- Fasteners: Nails not less than 30 x 3.75 mm galvanized or sherardized square twist.
- Fixing: Secure using not less than the number of nails recommended by anchor manufacturer.

620 WASHERS
- Standard: Plain to BS 4320, spring to BS 4464.
- Material and finish: To match bolts.
- Dimensions when seated directly on timber surfaces: Unless specified otherwise:
  - Diameter/ side length: Not less than 3 times bolt diameter.
  - Thickness: Not less than 0.25 times bolt diameter.

625 STAINLESS STEEL BOLTS, NUTS AND WASHERS
- Bolts and nuts:
  - Standard: To BS EN ISO 3506, Grade 304, (BS EN 10088 Grade: 1.4301).
- Washers:
  - Material: To match bolts.

630 BOLTED JOINTS

- Holes for bolts: Located accurately and drilled to diameters as close as practical to the nominal bolt diameter and not more than 2 mm larger.
- Washers: Placed under bolt heads and nuts that would otherwise bear directly on timber. Use spring washers in locations which will be hidden or inaccessible in the completed building.
- Bolt tightening: So that washers just bite the surface of the timber. Ensure that at least one complete thread protrudes from the nut.
- Checking: At agreed regular intervals up to Practical Completion. Tighten as necessary.

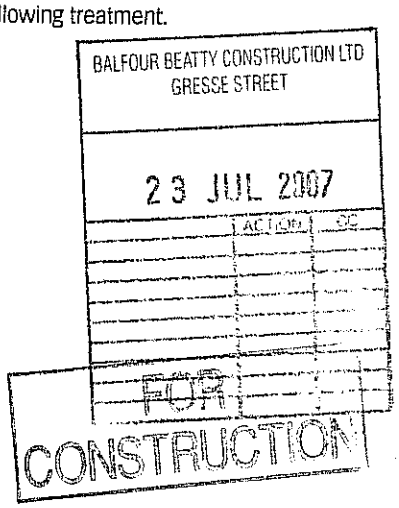
650 GLUED JOINTS

- Adhesive: To structural engineer's approval.
- Compatibility: Where relevant, obtain manufacturer's confirmation that adhesive is compatible with preservative/ fire retardant treatment.
- Glued structural components: Fabricated to BS 6446 in clean, controlled workshop conditions.

670 ANTICORROSION FINISHES FOR FASTENERS

- Galvanizing: To BS 7371-6, with internal threads tapped and lightly oiled following treatment.
- Sherardizing: To BS 7371-8, Class 1.
- Zinc plating: To BS EN ISO 4042 and passivated.
- Treatment not specified: Select from the above to suit service conditions.

END



H41 GLASSFIBRE REINFORCED PLASTICS PANEL CLADDING/ FEATURES

To be read with Preliminaries/ General Conditions.

TYPES OF CLADDING/ FEATURES

120 GRP DOUBLE SKIN FEATURE WALL CLADDING PANELS
- Primary support structure: plasterboard partitions and reinforced concrete walls.
- Panels:
  - Construction: double skin moulded and profiled panels, rigid foam core.
  - Fire rating: Class O Surface spread of flame
- Fixings and fasteners: As clause 480.
- Joints: panel design and manufacture to be configured such that all panel joints are concealed from view.
- Finish: prepared and painted matt with multi coat sprayed lacquer; colour and texture to CA's approval from lacquer manufacturer's full range.
- Accessories/ other requirements:
  Satin polished SS inserts as H31/180, edging and trim strips/profiles as shown on the drawings.
  Concealed reinforcement inserts to receive fixings for signage, pivots, hinges etc.
  Profiled recesses to receive lift call buttons as drawing A3115.
  Slot details with finished and spray lacquered return edge to all four sides for extract grilles and fire alarm panel viewing window as drawings A2125.
  All as Section K10.

DESIGN/ PERFORMANCE REQUIREMENTS

210 DESIGN
- GRP: Complete detailed design to meet requirements of this specification.
- Related works: Coordinate in detailed design.

230 INTEGRITY
- Requirement: Determine sizes and thickness of GRP units, sizes, number and spacing of fixings and incorporation of accessories to ensure resistance to factored dead, imposed and design live loads, and accommodation of deflections and thermal movements without damage.

320 DESIGN SAMPLES
- GRP samples: Before general manufacture obtain approval of appearance of fully tested compliant design samples.
  - Extent: Showing proposed colour, texture and incorporating a completed section of a joint.
  - Action: Obtain approval of appearance before proceeding. Retain as production control sample.

330 PROTOTYPE
- Element: At an agreed stage during detailed design construct a prototype of: each component
- Inspection: Obtain approval of appearance before proceeding. Retain prototype in undisturbed condition until completion of GRP installation.

MANUFACTURE

410 QUALITY OF WORK
- Manufacture: Compliant with design and performance requirements.
  - Materials: Appropriate and compatible.
  - Workmanship: Appropriate and in accordance with manufacturers' recommendations.
- Resins: Used as supplied and not adulterated.
- Fillers and admixtures: Submit proposals.
- Standard of finish: Appropriate to end use and position in building.
  - Prohibited blemishes: Including, but not limited to, wrinkling, spotting, striations, fibre patterning, fish eyes, blisters, crazing, cracking, dry patches and uneven or inconsistent colour.

440 MANUFACTURING ACCURACY
- Finished dimensions of completed units when erected:
  - Ambient temperature: Measurements taken at 16-18°C.

- Maximum permissible deviations:

Overall dimension involved (m)	Up to 2	2-3	3-4.5	4.5-6
Width and height:	+0 -2 mm	+0 -3 mm	+0 -5 mm	+0 -6 mm
Straightness of edges: deviation from intended line, any variation to be evenly distributed with no sudden bends or irregularities.	3 mm	4 mm	5 mm	6 mm
Squareness: taking the longer of 2 sides at any corner as a base line, the deviation of shorter side from perpendicular; dimension involved is the shorter side.	3 mm	4 mm	5 mm	6 mm
Twist: deviation of any corner from the plane containing the other 3 corners; dimension involved is the shorter side.	3 mm	5 mm	7 mm	8 mm

Flatness - deviation under a 1 m straight edge placed anywhere on a flat panel surface: 3 mm

460 LAMINATING
- Glassfibre content: Not less than 900 g/m² of glassfibre, in not less than two layers to each GRP skin.
- Reinforcement distribution:
  - Random reinforcement: Distributed uniformly.
  - Non random reinforcement: Correctly positioned and aligned.
- Layering of woven fabric reinforcement: Layered with chopped strand mat on both sides.
- Resin:glassfibre ratio: Not less than 2:1, higher as appropriate, with glass fully wetted out by resin.
- Layer bonding: Good overall bond between gel coats and layers of laminate.
- Consolidation of GRP: Well consolidated and free from air voids.

470 BONDING OF CONSTITUENTS
- Resin layers: Good overall bond between gel coats and layers of laminate.
- Additional components: Core materials, ties, ribs, fixings and accessories fully bonded to GRP skins over full contact surface area.

480 FIXINGS AND FASTENERS
- Loadbearing fixing type:
  - Material: stainless steel
- Restraint fixing type:
  - Material: stainless steel
- Extent of adjustment: To accommodate support structure/ cladding fabrication/ installation tolerances and thermal movement of GRP.

500 CURING
- Initial curing period at 20°C: 24 hours.
- Distortion during curing: Prevent.

510 HARDNESS TESTING
- Standard: To BS 2782-10: Method 1001.
- Timing: After curing.

- Extent: One test for each 1 m² of external surface area, not less than 2 tests per unit.
- Barcol hardness at ambient temperature: Not less than 30.

530 WEIGHT TESTING
- First unit of each type and size:
  - Compliance: In accordance with design and specification.
  - Weight: Record.
- Subsequent units:
  - Acceptable weight: Unmodified subsequent units to be within 10% of weight of first unit.

570 PRODUCTION RECORDS
- Recorded information:
  - Unique identification number.
  - Full details of composition.
  - Date of each stage of manufacture.
  - Dates and results of tests, checks and inspections.
  - Dimensions related to specified levels of accuracy.
  - Specific location in the finished work.
  - Other pertinent data, e.g. if the unit is a production control unit.
- Availability of records: For inspection on request.

580 RETENTION OF MOULDS AFTER PRODUCTION
- Purpose: Retain moulds and store in a reusable condition to allow manufacturing to recommence if required.
- Retention period: 6 years

INSTALLATION

605 PREPARATION
- Prefabrication: Complete products and attach fixings in workshop wherever possible.
- Identification: Mark or tag products. Do not mark surfaces visible in the complete installation.
- Electrolytic corrosion: Isolate dissimilar metals.

615 SUITABILITY OF STRUCTURE
- Contractor's survey:
  - Scope: Geometric survey of supporting structure, checking line, level and fixing points.
  - Coordinate: With surveys for adjacent cladding.
  - Give notice: If structure will not allow required accuracy or security of erection.
- Setting out: Establish erection datum points, lines and levels for a complete elevation at a time unless otherwise agreed.

625 INSTALLATION OF INTERFACES
- General: Locate flashings, closers etc. correctly with neat overlaps to form weathertight junctions.

630 ACCURACY OF ERECTION OF CLADDING
- Elevation joint widths: Within joint lengths, including in-line continuations across transverse joints, as follows:
  - Tolerance: Greatest width not to exceed least width by more than 10%
  - Variations: Evenly distribute, with no sudden changes.
- Offset in elevation: Between nominally in-line edges across transverse joints not to exceed 10% width of joint.
- Offset in plan or section: Between flat faces or adjacent panels across joints not to exceed 10% width of joint.
- Sealant joints width limitations: To recommendations of sealant manufacturer.
- Finished work: Square, regular, true to line and plane with satisfactory fit at junctions.

635 ACCURACY OF ERECTION OF GRP COMPONENTS
- Joint widths: Within joint lengths, including in-line continuations across transverse joints, as follows:
  - Tolerance: Greatest width not to exceed least width by more than 10%
  - Variations: Evenly distribute, with no sudden changes.
- Offset in elevation: Between component edges across transverse joints not to exceed 10% width of joint.
- Offset in plan or section: Between flat faces of adjacent units across joints not to exceed 10% width of joint.
- Sealant joints width limitations: To recommendations of sealant manufacturer.
- Finished work: True to line and plane with satisfactory fit at junctions.

640 FINAL FIXING
- Torque figures: Tighten threaded fastenings to figures recommended by manufacturer. Do not overtighten restraint fixings intended to permit lateral movement.

645 METALWORK
- Material standards and fabrication: As section Z11.

680 CLEANING DOWN
- General: Return to site at Practical Completion or when instructed and thoroughly clean down the entire area of the GRP work. Cleaning agents for the purpose must be approved by the GRP manufacturer.

END

H51 NATURAL STONE SLAB CLADDING/ LINING/ FEATURES

To be read with Preliminaries/ General conditions.

TYPES OF CLADDING

110 GRANITE SLAB COUNTERTOP
- Support structure/ background: Steel framing as clause 230.
- Stone:
  - Name (traditional): Assoluto Nero Belfast.
  - Petrological family: Granite.
  - Colour: Black.
  - Supplier: Marmi Ltd (Tel: 01621 840 555).
  - Finish: Polished and sealed (Lithofin Stainstop from Casdron Enterprises Ltd. +44 1962 73 2126) finish to wearing/exposed surfaces.
  - Quality: Premium quality, batched and matched, with close uniformity to CA's approval. Free from vents, cracks, fissures, discolouration, or other defects deleterious to strength, durability or appearance. Before delivery to site, season thoroughly, dress and work in accordance with shop drawings prepared by supplier.
  - Thickness: Minimum 20 and 30mm.
  - Work size: As indicated on the drawings and to CA's approval.
- Fixings: As clause 230.
- Joints:
  - Type:
    Basic joints: Close butt jointed and filled.
    Bond pattern: As shown on the drawings, to CA's approval.
  - Edge treatment: Square edged honed and sealed.

GENERAL REQUIREMENTS/ PREPARATORY WORK

210 DESIGN
- Cladding: Complete detailed design.
  - Standard: To BS 8298.
- Stone cladding to be supplied, designed and fixed by the same subcontractor.
- Related works: Coordinate in detailed design.
- Fabrication drawings: Subcontractor to produce minimum 1:20 scale drawings showing details of proposed fixings, joints and setting out for cladding, to be approved by the CA prior to any cutting or fabrication.

230 FIXINGS
- Fixings must be designed and supplied by a suitably experienced recognised supplier to approval.
- Standard: To BS 8298, clauses 2.3 and 3.10.
- Dimensions: Not less than recommended by manufacturers.
- Extent of adjustment: To accommodate support structure/ background, cladding fabrication/ installation tolerances and the specified requirements for accuracy.
- Method of fixing: Secret fixed as recommended by manufacturers.

260 APPEARANCE
Make arrangements to inspect samples of stone which represent the range of variation in appearance. Obtain approval of appearance before placing orders with suppliers or proceeding with production.

261 STONE SAMPLES
- General: Before commencing detailed design, submit labelled samples or arrange for samples that represent the range of variation in appearance to be inspected. Obtain approval of appearance before placing orders with suppliers or proceeding with production.

281 CONTROL SAMPLES
- General: Complete areas of finished work and obtain approval of appearance before proceeding.
- Size: To CA's approval.
- Location: To CA's approval.

DESIGN/ PERFORMANCE REQUIREMENTS

315 INTEGRITY OF LINING
- Requirement: Determine sizes and thickness of slabs/ panels, size, number and spacing of fixings, configuration and location of support systems and incorporation of accessories to ensure the lining will resist factored dead, imposed and design live loads, and accommodate deflections and thermal movements without damage.

330 ACCURACY OF ERECTION
- Elevation joint widths: Within joint lengths, including in-line continuations across tranverse joints, as follows:
  - Tolerance: Greatest width not to exceed least width by more than 25%.
  - Variations: Evenly distribute, with no sudden changes.
- Offset in elevation: Between nominally in-line edges across transverse joints not to exceed 10% width of joint.
- Offset in plan or section: Between flat faces or adjacent panels across joints not to exceed 10% width of joint.
- Joints width limitations: To recommendations of joint material manufacturer.
- Finished work: Square, regular, true to line and plane with satisfactory fit at junctions, all to CA's approval.

FABRICATION AND INSTALLATION

505 PROTECTION
- Prevent over stressing of units during transit, handling, storage and fixing.
- Store units on level bearers and separate with resilient spacers.
- Prevent damage to units and any chipping, staining, marking or dirtying of surfaces which will be visible in the completed work.

510 GENERALLY
- Location of joints: Joints must occur only at positions indicated on final detailed drawings.
- Electrolytic corrosion: Isolate dissimilar metals.
- Prefabrication: Machine cut and drill products in workshop wherever possible.
- Identification: Mark or tag products. Do not mark surfaces visible in the complete installation.
- Natural bed: Indicate on a non exposed surface of each stone.
- Cleanliness: Keep facework clean. Rubbing to remove marks and stains not permitted.

520 CUTTING OF STONE
- Standard: To BS 8298 for production generally, including permissible deviations.
- Minimum thickness of stone to be in accordance with BS 8298, clause 3.9 and table 4.
- Bedding: Appropriate to position.
- Oversize stones: Leave selected stone units oversize, to accommodate deviations within building structure. Cut to precise dimensions taken on site.
  - Selected units: Clearly identify on shop drawings.

530 INSPECTION OF STONE UNITS
- All completed units must be carefully inspected and checked by the stone producer for match with approved sample(s) and compliance with the specification before despatch to site.
- Give notice to the CA to allow him to inspect:
  - At appropriate stages of production.
  - Before dispatch to site.

540 SUITABILITY OF STRUCTURE
- Contractor's survey:
  - Programme: Not less than 12 weeks before commencement of cladding installation.
  - Scope: Geometric survey of supporting structure, checking line, level and fixing points.
  - Coordinate: With surveys for adjacent cladding.
  - Give notice: If the structure will not allow the required accuracy or security of erection.
- Setting out: Establish erection datum points, lines and levels for a complete elevation at a time unless otherwise agreed.

560 METALWORK
- Material standards and fabrication: As section Z11.

575 WELDING

- In situ welding: Permitted, subject to the consent of the Employer, and completion of a 'hot work permit' form and compliance with its requirements.

580 FIXING

- Torque figures and shim dimensions: Do not exceed fixing manufacturer's recommendations.
- Grouting: Secure fixings in place in cladding and support structure/ background with cement:sand, epoxy or modified polymer mix, as recommended by the stone supplier.
- External cladding: Do not use mortar spacer dabs. Keep cavity clear of debris.
- Give reasonable notice to the CA to allow inspection:
  - Before covering up load bearing fixings.
  - Before proceeding with next course on completion of: Plinth course to allow inspection of restraint fixings and cavity.

635 MOVEMENT/ OTHER JOINTS

- In addition to the basic joints, the following sealant filled joints shown on the drawings are required as part of this section:
  - Horizontal movement joints: at max 3.6m centres, to coincide with support fixings: 12 mm wide
  - Vertical movement joints: At intervals to accommodate relative movement between the cladding and the structure: 12 mm wide
  - Joints at junctions between cladding and adjacent claddings/trims: 12 mm wide
  - Structural movement joints: 25 mm wide
  - Joints between cladding and windows/doors: 12 mm wide.
- Sealant: Silicone.
  - Manufacturer: GE Bayer Silicones (Tel: 01204 469090).. Product reference: Silpruf.
  - Colour: Special colour to CA's approval.
  - Application: As section Z22.
- Joint widths: Where not specified, to be as small as practicable. Allow for shrinkage, thermal and other movements in structure and cladding

FOR CONSTRUCTION

640 COMPLETION

- On completion of building operations thoroughly clean down the face of the stonework to remove all dust, dirt, marks, stains and mortar droppings.

END

BALFOUR BEATTY CONSTRUCTION LTD
GRESSE STREET

23 JUL 2007

	ACTION	CC