06050

5plus architects

MAG

Plot H5 Airport City

A33, H11, H72, H92, L10 & L40

Architectural Specification

S2 - For Information

20-04-2026

A new 276 bed hotel at Mix Manchester completing a new public square.

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A33
Quality Standards/Control

Clauses

101 Standards and Building Codes

1. Standards
   1.1. To current British Standards (BS) or European Standards (ENs) and International Standards (ISO, etc).
   1.2. Where conflicting standards are identified, the more onerous requirements to apply. The Employer's Agent shall be the arbitrator whose confirmation is to determine the more onerous.
2. Building Codes: Comply with the current and latest editions of all relevant Codes of Practice, Standards, Fire Regulations, Building Regulations and local Building Codes, Safety Regulations and any other regulations applicable to the installation, together with all relevant Statutory Rules, Regulations, Byelaws and other enforceable instruments applicable to both the design and execution of the works.
3. Amendments to Standards and Building Codes:
   3.1. All references in the Architectural Specification to European, harmonised European (hEN), British and other standards, regulations and requirements of statutory bodies shall be deemed the latest published editions at the time of Contract award.
   3.2. Where such standards, regulations and requirements are amended after Contract award and affect the Contractor’s responsibilities during the course of the works, immediately inform the Employer's Agent in writing.
4. Non-compliance:
   4.1. If unable to comply with the governing standards or regulations and proposing to substitute other National Standards, inform the Employer's Agent within the summary of deviations from the Architectural Specification. Provide fully detailed reasons for being unable to comply, together with any design and/ or technical implications.
   4.2. Failure to provide such notification prior to Contract award shall be deemed as acceptance of the governing standards or regulations and later notification shall be legally void.
5. Substitution or relaxation of Standards to be agreed in writing by the Employer's Agent in advance.

102 Incomplete Documentation

1. General: Where and to the extent that products or work are not fully documented, they are to be:
   1.1. Of a kind and standard appropriate to the nature and character of that part of the Works where they will be used.
   1.2. Suitable for the purposes stated or reasonably to be inferred from the project documents.
2. Contract documents: Omissions or errors in description and/or quantity shall not vitiate the Contract nor release the Contractor from any obligations or liabilities under the Contract.

103 Quality of Products and Materials

1. Generally: New (Proposals for recycled products may be considered).
   1.1. Where and to the extent that acceptance of the quality of materials or of the standards of workmanship is a matter for the opinion of the Employer's Agent such quality and standards shall be to the reasonable satisfaction of the Employer's Agent.
   1.2. Proprietary products to carry a British Board of Agrément certificate.
   1.3. Only to be used for their intended purpose.
   1.4. Materials must meet the requirements of the Architectural Specification.
2. Supply of each product: From the same source manufacturer.

3. Whole quantity of each product required to complete the works: Consistent kind, size, quality and overall appearance, with no blemishes.
4. Tolerances: Where critical, measure a sufficient quantity to determine compliance.
5. Deterioration:
    5.1. Prevent: Premature deterioration shall not be accepted. Order in suitable quantities to a programme and use in the appropriate quantities.
    5.2. Dust/friable materials: Remove.
6. Conformity assessment and certifying bodies:
    6.1. Notified Bodies (NBs): EU certifying bodies for CE marking purposes.
    6.2. Approved Bodies (ABs): UK certifying bodies for UKCA and UKNI marking purposes.
7. Accepted marking designations
    7.1. UKCA
    7.2. CE
    7.3. Refer also to The Construction Products (Amendment) Regulations 2025.
8. Damage: Ensure no damage occurs during delivery and storage on site.
9. Environmental Product Declaration (EPD): Provide an independently verified and registered EPD that communicates transparent and comparable information about the life-cycle environmental impact of the specified products. Advise the Employer's Agent if an EPD is not available.
10. Volatile Organice Compounds (VOC): To be zero or low.
11. Health hazards: No material shall be a potential health hazard.
12. Compatibility: All materials to be compatible with each other.
13. Substitutions/alternative proposals: Refer to Section A25/190.

104 Quality Control and Management

1. Establish and maintain to ensure that the Works, including the work of subcontractors, comply with specified requirements.
2. Standard: In accordance with BS EN ISO 9001.
3. Contractors certified to the BS EN ISO 9000 family of standards shall be monitored in accordance with these standards.
4. Quality programme:
    4.1. Defined in a Quality Control Manual or similar document.
    4.2. It shall describe an organisation systems, inspection and test plan procedures to ensure that all essential inspection requirements are determined and satisfied throughout all phases of the works.
5. Tolerance Quality Control Manual:
    5.1. To cover all aspects of tolerance compliance relating to the works.
    5.2. A quality control proposal shall be prepared for submission. It shall include:
        5.2.1. The various types of quality control checks that to be carried out during each stage of the works; proposed methods;
        5.2.2. Personnel to be employed (including their qualifications);
        5.2.3. How each type of tolerance check shall be recorded and maintained for future reference.
6. As a minimum, the Quality Control Manual shall meet the requirements of this Architectural Specification.
    6.1. Facilities shall be provided for any examination of these proposal at the works.
    6.2. Include details of any formal approvals held for the Contractor's or any sub-contractor's quality system or any evaluations or assessments carried out by independent third parties.
7. Timescale: To be provided within 30 days of formal confirmation to proceed with the works.

8. Inspection and test plan: To be for each major item of work or type of fabrication which shall detail, in sequential order:
    8.1. The principal activities to be carried out.
    8.2. The type, method and frequency of inspections and tests to be carried out.
    8.3. The Inspecting Body.
    8.4. The acceptance criteria.
    8.5. The records to be kept.
9. Hold point: A point on the inspection and test plan beyond which the process may not continue until it has been accepted.
10. Basis of inspection: Provide the basis of inspection for the item of work and shall be accepted prior to commencement of the work.
11. Resources: At all times during the Contract period, make available at the works all necessary resources and facilities and implement any reviews and amendments of the quality control manual required by the Employer's Agent.
12. Information and procedures: As a minimum the Quality Control Manual shall include information and procedures as defined below:
    12.1. Organisation and Management.
    12.2. Facilities, Measuring and Test Equipment.
    12.3. Personnel Training and Certification.
    12.4. Documentation.
    12.5. Receipts, Storage, Handling and Transportation.
    12.6. Materials.
    12.7. Welding.
    12.8. Fabrication and Erection.
    12.9. Tolerance Control.
    12.10. Prototypes.
    12.11. Painting and Coating.
    12.12. Inspection and Testing of Materials and Workmanship.
    12.13. Non-conforming Items.
    12.14. Detailed Design.
    12.15. Control of Purchased Materials and Services.
    12.16. Completed Item, Inspection and Test Results.
    12.17. Records.
    12.18. Review of the Quality System.
13. Auditing:
    13.1. The Contractor's proposals shall be reviewed to ensure:
        13.1.1. Methods of working will produce acceptable work.
        13.1.2. Conformity with the Architectural Specification.
    13.2. Quality Manager:
        13.2.1. A senior member of the technical organisation shall be designated as Quality Manager.
        13.2.2. To be independent of the other functions and be held responsible for the production and implementation of the Quality Control Manual.
    13.3. Provision of facilities: Throughout the Contract period make all facilities available such that quality audits, according to the BS EN ISO 9000 family of standards or any other established system, can be carried out.

13.4. Records: Maintain full records, keep copies on site for inspection, and submit copies on request.

13.4.1. Content of records:

13.4.1.1. Identification of the element, item, batch or lot including location in the works.

13.4.1.2. Nature and dates of inspections, tests and acceptance.

13.4.1.3. Nature and extent of nonconforming work found.

13.4.1.4. Details of corrective action.

13.5. Deficiencies:

13.5.1. To be reported.

13.5.2. Deficient items shall be considered as being of suspect quality and shall be quarantined in a separate holding area.

13.5.3. Await instruction to either rework or repair the affected item, or be notified that it is rejected. Do no proceed with any works until instruction has been given.

13.6. Quality control methods:

13.6.1. Appointments:

13.6.1.1. The appointment of any sub-contractors, or the carrying out of any work at any place other than the Contractor's nominated principal workplace, shall be to the acceptance of the Employer's Agent.

13.6.1.2. The work shall be carried out under equivalent conditions of QA/QC to those at the nominated principal workplace.

13.6.1.3. Demonstrate that the methods used to select, control, inspect and verify the work carried out conforms to the requirements of the Architectural Specification.

13.6.2. Purchase orders:

13.6.2.1. To be made available when requested.

13.6.2.2. Purchase orders shall detail the item or service in terms of quality, grade, type, appropriate British or other Standard applicable, inspection, test and documentation requirements.

13.6.3. QA/QC programme management and organisation: To be appropriate for the works. All details to be contained in the Quality Control Manual.

13.6.4. Facilities, measuring and test equipment: To be re-calibrated and checked against the equipment manufacturer's recommended standards. Equipment that does not provide accurate or consistent results shall not be used.

13.6.5. Personal training/certification: To the acceptance of the Employer's Agent.

13.6.6. Documentation of materials and processes: Shall be considered adequate when they are deemed by the Employer's Agent to verify that the Architectural Specification requirements have been met.

13.6.7. Controls of materials: Control receipt and storage of incoming materials to ensure that it is evident materials have been used in the correct locations and works.

13.6.8. Identification of materials: Refer to clause A39/202.

13.6.9. Progress photographs: To be provided on a monthly basis.

13.6.10. Fabrication operation and testing procedures: To be confirmed by suitable test to confirm that connections placed during fabrication and erection have met the Architectural Specification requirements.

13.6.10.1. Fabrication and erection work: To be monitored to ensure compliance with the design/working drawings and Architectural Specification.

13.6.10.2. Provide programme of work detailing significant stages in the fabrication process that may need to be witnessed by the Employer's Agent.

13.6.11. Painting and coatings materials and processes checks:

13.6.11.1. To be as stated above.

13.6.11.2. To be monitored at appropriate stages to ensure works are in compliance with the Architectural Specification and are of the required levels of quality and workmanship.

14. The Contractor's own methods and procedures shall be used to implement all of the above requirements.
15. Confirm in writing that on dispatch of each finished item, from the point of manufacture they have been fabricated in accordance with the Quality Control Manual and Architectural Specification.

105 Quality of Execution

1. Generally: Fix, apply, install or lay products securely, accurately, plumb, neatly and in alignment.
2. Colour batching: Do not use different colour batches where they can be seen together.
3. Dimensions: Check on-site dimensions.
4. Finished work: Not defective, e.g. not damaged, disfigured, dirty, faulty, or out of tolerance.
5. Location and fixing of products: Adjust joints open to view so they are even and regular.

106 Inspections

1. Products and executions: Inspection or any other action must not be taken as acceptance unless confirmed in writing referring to:
   1.1. Date of inspection.
   1.2. Part of the work inspected.
   1.3. Respects or characteristics which are approved.
   1.4. Extent and purpose of the acceptance.
   1.5. Any associated conditions.

107 Related Work

1. Details: Provide all trades with necessary details of related types of work. Before starting each new type or section of work ensure previous related work is:
   1.1. Appropriately complete.
   1.2. In accordance with the project documents.
   1.3. To a suitable standard.
   1.4. In a suitable condition to receive the new work.
2. Preparatory work: Ensure all necessary preparatory work has been carried out.
3. Interfaces: Ensure coordination of interfacing works.

108 Manufacturer's Recommendations/Instructions

1. General: Comply with manufacturer's printed recommendations and instructions curren on the date of the invitation to tender.
2. Exceptions: Submit details of changes to recommendations or instructions.
3. Execution: Use ancillary products and accessories supplied or recommended by main product/ system manufacturer. If this is not possible, advise the Employer's Agent prior to purchase or installation.
4. Products: Comply with limitations, recommendations and requirements of relevant valid certificates.

109 Water for the Works

1. Main supply: Clean and uncontaminated.
2. Other: Do no use until:

2.1. Evidence of suitability is provided.

2.2. Tested to BS EN 1008 if instructed.

110 Prohibited Materials

1. Prohibited materials will include any materials that:
   1.1. Contravene any relevant British Standard or EU equivalent.
   1.2. Contravene the recommendations of the British Council for Offices' publication 'Good Practice in the Selection of Construction Materials (2011)'.
   1.3. Are listed in the Contract and below:
      1.3.1. Asbestos and Asbestos Containing Materials (ACM).
      1.3.2. Brick slips (adhesive fixed).
      1.3.3. Cadmium products.
      1.3.4. Chlorides: Calcium chloride and sodium chloride.
      1.3.5. Chlorofluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs) and Hydrofluorocarbons (HFCs) and other Ozone Depleting Materials.
      1.3.6. Coal tar.
      1.3.7. Lead and Lead Containing Materials (LCM).
      1.3.8. Hair plaster.
      1.3.9. High alumina cement.
      1.3.10. Urea formaldehyde.
      1.3.11. Urea formaldehyde foam.
      1.3.12. Polychlorinated Biphenyls (PCBs).
      1.3.13. Polyisocyanurate (PIR) or polyurethane foam (PUR) in cladding/façade works.
      1.3.14. Polyethylene based insulation.
      1.3.15. Marine sea dredged aggregates (not in compliance with BS EN 1260).
      1.3.16. Mercury.
      1.3.17. Materials listed under the Montreal Protocol on Substances that Deplete the Ozone Layer.
      1.3.18. Machine Made Mineral Fibres (MMMF).
      1.3.19. Mundic.
      1.3.20. Pentachlorophenol.
      1.3.21. Silica dust.
      1.3.22. Vermiculite, unless fibre-free.
      1.3.23. Wood wool.
      1.3.24. Any timber not sourced from a certified scheme as detailed in this Architectural Specification.
      1.3.25. Lindane.
      1.3.26. Pentachlorophenol (PCP).
      1.3.27. Chromated Copper Arsenate (CCA).
      1.3.28. Tributyltin (TBT).
      1.3.29. Contaminated gypsum board.
      1.3.30. Products that are either not noncombustible nor meet the Loss Prevention Standard LPS 1181 or Factory Mutual Standard FM 4880.
      1.3.31. Composite metal cladding panels with interstitial polyethylene insulated core.
      1.3.32. PTFE fabrics.

1.3.33. Plastic lumber materials that contain: wood-plastic composites, multiple commingled recycled consumer plastics, fiberglass (for nonstructural applications).

1.3.34. Bitumen coated polythene save that the use of bitumen coated polythene may be permitted for tanking and DPM.

1.3.35. Pitch polymer DPC.

2. Asbestos containing materials: Report immediately suspected materials discovered during execution of the works. Do no disturb and agree methods for safe removal or encapsulation.

111 Moisture

1. Wetness or dampness: Prevent, where this may cause damage to the works.
2. Drying out: Control humidity and the application of heat to prevent:
   2.1. Blistering and failure of adhesion.
   2.2. Damage due to trapped moisture.
   2.3. Excessive movement.
3. Changes in the building conditions such as humidity levels, freezing etc. shall not affect the performance of installed works.
4. Capillary action of water: Prevent from within the works.

112 Building Interiors

1. Protection:
   1.1. Temporary protection to be provided by the Contractor.
   1.2. Prevent damage from exposure to the environment, including weather, flora, fauna and other causes of material degradation during he execution of the works.

113 Timber Procurement

1. Timber (including timber for wood-based products): Obtained from well-managed forests and/ or plantations in accordance with:
   1.1. The laws governing forest management in the producer country or countries.
   1.2. International agreements such as the Convention on International Trade in Endangered Species of wild fauna and flora (CITES).
   1.3. TRADA Wood Information Section 2/3, sheet 58 ‘Sustainable timber sourcing’.
2. Documentation: Provide either:
   2.1. Documentary evidence (which has been or can be independently verified) regarding the provenance of all timber supplied.
   2.2. Evidence that suppliers have adopted and are implementing a formal environmental purchasing policy for timber and wood-based products.
3. Certification scheme(s):
   3.1. UK Timber procurement policy Category A evidence certification scheme.
   3.2. Forest Stewardship Council (FSC).
   3.3. Grown in Britain (GiB).
   3.4. Sustainable Forestry Initiative (SFI), with Chain of Custody.
   3.5. Sustainable Forestry Initiative (SFI), with Chain of Custody Programme for the Endorsement of Forest Certification (PEFC).
4. Plywood: Shall preferably be from softwood or temperate hardwoods from sustainable sources.
5. Tropical hardwoods shall not be used unless otherwise agreed with the Employer's Agent. The use of tropical timbers must be via one of the certified schemes listed, and must not be listed on any of the CITES appendices for endangered or threatened species.

114 General Workmanship Requirements

1. Refer to the individual work sections for specific requirements.
2. Workmanship to be in accordance with BS 8000.
3. Operatives: Appropriately skilled and experienced for the type and quality of work.
4. Registration: With Construction Skills Certification Scheme.
5. The building shall be watertight prior to the commencement of internal finishes and associated works, unless otherwise agreed with the Employer's Agent.
6. Sequence:
   6.1. The works are to be carried out in the most appropriate sequence to guarantee installation quality and avoid the need to dismantle or adjust installations to accommodate such elements, including fully complete mechanical and electrical installations.
   6.2. Do not cut, drill or otherwise alter the work of others to accommodate the system/ product installation without first seeking the acceptance of the Employer's Agent.
7. Sequence the works to ensure no adjacent works or trades are affected by any installation. If other works need to be altered in any way, the solution shall be determined with the Employer's Agent.
8. Remedial works: Not accepted. All works to be new unless otherwise agreed with the Employer's Agent.
9. Suppliers/Sub-contractors (and all their associated materials, equipment etc.): To be the responsibility of the Contractor until the end of the contracted warranty period.
10. Covering up:
    10.1. Not permitted without agreement.
    10.2. Provide suitable notice for inspection by the Employer's Agent prior to the covering of any works.

201 Samples

1. Products or executions: Comply with all other specification requirements and in respect of the stated or implied characteristics either:
   1.1. To express acceptance.
   1.2. To match a sample expressly approved as a standard for the purpose.
2. Acceptance of samples: The acceptance of samples by the Employer's Agent is to:
   2.1. Verify that the written specification has been interpreted correctly.
3. All samples submitted shall accurately represent the visual colour, finish and quality of the material requested in the Architectural Specification.
4. All samples shall be reviewed by the Employer's Agent to ensure compliance with the Architectural Specification and design drawings.
5. Provide, if requested by the Employer's Agent supporting technical data for samples submitted.
6. Any samples submitted can be retained for reference and comparison at the time of contract award.
7. Provide further samples as requested by the Employer's Agent during the construction stage to confirm quality has been maintained.

203 Benchmarks

1. The first area (of size to be agreed) of the installed works to be checked by the Employer's Agent to ensure the works are as per the accepted samples and detailed design.
2. Benchmarks must be accepted by the Employer's Agent before the commencement of the full installation.
3. If the Benchmark is not accepted, make adjustments as required/instructed before proceeding with the full installation.

4. Accepted Benchmarks shall be suitably protected to ensure they can be used as a comparison against the remainder of the installations.

204 Acceptance of Products

1. Submissions, samples, inspections and tests: Undertake or arrange to suit the works programme.
2. Acceptance: Relates to a sample of the product and not to the product as used in the works. Do not confirm orders or use the product until acceptance of the sample has been obtained.
3. Complying sample: Retain in good, clean condition on site.

205 Acceptance of Execution/Workmanship

1. Submissions, samples, inspections and tests: Undertake or arrange to suit the works programme.
2. Acceptance: Relates to the stated characteristics of the sample. (If acceptance of the finished work as a whole is required this is specified separately). Do not conceal, or proceed with affected work until compliance with requirements is confirmed.
3. Complying sample: Retain in good, clean condition on site.

301 Accuracy of Instruments

1. Accuracy in measurement: Use instruments and methods described in BS 5606, Appendix A.
2. Calibration: All equipment for setting out, testing etc. shall be regularly calibrated.

302 Setting Out

1. General:
    1.1. Submit details of methods and equipment to be used in setting out the works.
    1.2. Setting out to be in accordance with the recommendations of BS 5606.
2. Levels and dimensions: Check and record the results on a copy of drawings. Notify discrepancies and obtain written instructions before proceeding.
3. Inform: When complete and before commencing construction.
4. Base Datum Point:
    4.1. Establish a suitable Base Datum Point from which all planned grids and levels are to be set out. Agree with the Employer's Agent all positions and markings as the work proceeds.
    4.2. The agreed Base Reference Datum shall be located to within ±2mm accuracy of the design dimensions.
    4.3. Base Datum Point shall be secured in position throughout the duration of the works.

303 Appearance and Fit

1. General:
    1.1. Refer to the Structural Engineer's documentation.
    1.2. Comply with BS EN ISO 286: Part 1.
    1.3. Refer to the individual Work Sections for specific tolerance requirements.
    1.4. Building movement and tolerances to be accommodated for within the works.
    1.5. Tolerances shall be the maximum dimensional deviation from a specified or agreed value or position.
    1.6. The works shall be free from deformation outside of specified tolerances and shall not be subject to warping, twisting and/or perishing but remain stable, firm, free from vibrations, knocking, rattles and/or whistles, squeaks or other such noises, taking into account known or specified conditions.
2. Tolerances and dimensions: If likely to be critical to execution or difficult to achieve, as early as possible either:

2.1. Submit proposals; or

2.2. Arrange for inspection of appearance of relevant aspects of partially finished work.

2.3. All dimensions are to be compatible and coordinated with other applicable design dimensions, tolerances and movements. Working drawings shall show how the tolerances of adjoining or adjacent trades are to be accommodated.

2.4. Prior to the commencement of manufacture, all dimensions shall be checked on site, with dimensions critical to the works to be confirmed. This shall be undertaken in a timely manner to enable corrective action to be taken to the works, or the work of others, ensuring this fits with the agreed or proposed tolerances.

2.5. All common reference points are to be confirmed and agreed with the Employer's Agent, with all dimensional checks to be carried out before manufacture.

3. General tolerances (maximum): To BS 5606, tables 1 and 2.
4. Manufacture and install the works within stated and acceptable tolerances, without exceeding specified or best practice deflection limits.
5. The proposed Contractor's methods for achieving and monitoring the fabrication and erection tolerances during all stages of the works shall be provided for acceptance by the Employer's Agent, with regular detailed records of the ongoing control and tolerance achieved submitted.

5.1. Check tolerances up to handover.

6. Line and level: Ensure components are installed plumb or horizontal and line up with adjacent components in all directions.
7. Set out critical dimensions first, relying on some flexibility in other less critical dimensions.
8. Pay particular attention to accuracy of setting out, including use of jigs or templates.
9. Check mean size of components and scatter of sizes around the mean size.
10. Discrepancies:

10.1. Inform the Employer's Agent immediately if the specified tolerances can not be met, of all tolerance omissions, inconsistencies or incompatibilities.

10.2. Report any discrepancy in the values of existing datum reference points, datum levels, buildings, foundations or other features to which the works are related to the Contractor and obtain written instructions before proceeding.

10.3. Where two or more different tolerances solutions for the same condition are proposed, that with least tolerance shall apply. This shall be confirmed and submitted by the Contractor to the Employer's Agent. Tolerance shall not be cumulative.

304 Critical Dimensions

1. Critical dimensions: Set out and construct the works to ensure compliance with the tolerances stated.

305 Record Drawings

1. Site setting out drawing: Record details of all grid lines, setting-out stations, benchmarks and profiles. Retain on site throughout the Contract and hand over on completion.

401 Service Requirements

1. Refer to the Services Engineer's documentation for requirements, integration and coordination.
2. Unless agreed with the Employer's Agent, all cabling, wiring, pipework, earth bonding and lightning protection to be concealed.
3. Surface mounted items: Flush where visible.
4. Earth bonding/lightning protection:

4.1. In accordance with BS 7430, BS 7671 and BS EN 62305.

4.2. To be concealed/inconspicuous.

4.3. Interfacing works: Shall not be impaired.

4.4. Extraneous conductive parts (parts which are liable to transmit a potential, including earth potential, and not forming part of the electrical installation): To be effectively bonded to earth.

4.4.1. Each component shall constitute an extraneous conductive part.

4.5. Equipotential bonding shall be provided to ensure that the various exposed conductive parts and extraneous conductive parts as defined by BS 7671 shall be at a substantially equal potential.

4.6. Details of earth bonding shall be to the acceptance of the Employer's Agent and Services Engineer.

5. The detailed design shall include and coordinate service penetrations and interfaces. Where services penetrate or interface with the works, provide all necessary works to ensure the performance is maintained.
6. Provide all test certificates as required.
7. Services Integration:

7.1. Refer to Services Engineer's documentation and/or the design drawings.

7.2. Where not indicated, locations to be agreed with the Employer's Agent.

501 Protection

1. Protect all materials and products to be incorporated into the works at all stages through to Practical Completion against damage so that they remain clean, with no dents, scratches, mould or such like.
2. Any damaged materials or products shall not be accepted.
3. Details of protective measures at all stages to be provided before each stage.
4. Surface treatments: Prevent contamination by dust and debris.
5. Packing and crates:

5.1. To be labelled on the outside to prevent unnecessary opening on site. Labelling shall include:

5.1.1. Content reference.

5.1.2. Quantity of contents.

6. Glazed elements:

6.1. Store in accordance with the manufacturers recommendations and ensure glazing and all associated elements are not damaged or become distorted or weathered.

6.2. Packaged elements to be separated/ protected to avoid scratches or other surface damage.

7. Mould: The works shall not permit the growth or dispersal of any fungi, moulds, spores or mycotoxins of any kind.

502 Pest Infestation

1. The detailed design, manufacturer and installation of the works shall take all necessary measures to protect against infestation by pests, birds, plants, insects and/or vermin.
2. Measures shall be in accordance with the recommendations of BRE Digest 415 Reducing the risk of pest infestations in buildings and BRE Digest 418 - DIG 418 Bird, Bee and Plant Damage to Buildings.

503 Defects in Existing Work

1. Undocumented defects: When discovered, immediately give notice. Do no proceed with affected related work until a response has been received.
2. Documentes remedial work: Do no execute work which may:

2.1. Hinder access to defective products or work; or

2.2. Be rendered abortive by remedial work.

504 Continuity of Thermal Insulation

1. Record and report: Confirm that work to new, renovated or upgraded thermal elements has been carries out to conform to specification. Include:
    1.1. The address of the premises.
    1.2. The Contractor's name and address.
    1.3. The name, qualification and signature of the competent person responsible for checking compliance.
    1.4. The date on which the installation was checked.
2. Submit: Before completion of the works.
3. Copy: To be lodged in the building manual.

505 Energy Performance Criteria

1. Assessment: Undertaken by a member of an approved accreditation scheme. Submit details of scheme name and evidence of qualifications when requested.
    1.1. Building Type: Hotel
2. Format
    2.1. Certificate: To be incorporated in the Building Manual.
3. Submit: Before the date for completion stated in the contract.

506 Proposals for Rectification of Defective Products/Executions

1. Proposals: Immediately any execution or product is known, or appears, to be not in accordance with the Contract, submit proposals for opening up, inspection, testing, making good, adjustment of the Contract Sum, or removal and re-execution.
2. Acceptability: Such proposals may be unacceptable and contrary instructions may be issued.

507 Measures to Establish Acceptability

1. General: 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:
    1.1. Will be at the expense of the Contractor.
    1.2. Will not be considered as grounds for revision of the completion date.

601 Work Before Completion

1. General: Report any damaged work to the Employer's Agent.
2. Temporary markings, coverings and protective wrappings: Remove unless otherwise instructed.
3. Cleaning: Clean the works thoroughly inside and out, including all accessible ducts and voids. Remove all splashes, deposits, efflorescence, rubbish and surplus materials.
4. Cleaning materials and methods: As recommended by manufacturers of products being cleaned, and must not damage or disfigure other materials or construction.
5. COSHH dated data sheets: Obtain for all materials used for cleaning and ensure they are used only as recommended by their manufacturers.
6. Minor faults: Touch up in newly painted work, carefully matching colour and brushing out edges. Repaint badly marked areas back to suitable breaks or junctions.
7. Moving parts of new work: Adjust, ease and lubricate as necessary to ensure easy and efficient operation, including doors, windows, drawers, ironmongery, appliances, valves and controls.

602 Making Good Defects

1. Remedial work: Arrange access with the Employer's Agent.

2. Rectification: Give reasonable notice for access to the various parts of the works.
3. Completion: Notify when remedial works have been completed.

Ω End of Section

H11
Curtain walling

Tendering

100 Section requirements

1. The works shall comply with the A Section, other applicable Work Sections and the applicable Z Sections of this Architectural Specification.
2. This section shall be read in conjunction with other project-related specifications, reports, documentation and design drawings.
3. Design responsibility:
    3.1. Descriptive: This is a design intent and performance-based section that the Contractor/Sub-Contractor must comply with when undertaking the detailed design to complete the design solution. The Contractor/Sub-Contractor retains full responsibility for completing the detailed design, complying with the performance criteria and the execution of the works.

105 Information to be provided with tender

1. Submit the following curtain walling particulars
    1.1. Evidence of compliance: All curtain walling to be CE marked to BS EN 13830. Submit Declaration of Performance (DoP). CE marking and Declaration of Performance (DoP) requirements for structural sealant glazing to be submitted on the basis of a manufacturer's European Technical assessment (ETA) prepared in accordance with EOTA technical guide ETAG 002 (Parts 1, 2 and 3).
    1.2. Typical plan, section and elevation drawings at suitable scales.
    1.3. Typical detailed drawings at large scales, including head, sill and jamb details.
    1.4. Technical information and certification demonstrating compliance with specification of proposed incorporated products and finishes, including glass units, doors and louvres.
    1.5. Certification, reports and calculations demonstrating compliance with specification of proposed curtain walling.
    1.6. Proposals for connections to and support from the building structure and building components.
    1.7. Proposals for amendments to primary supporting structure and for secondary supporting structure additional to that shown on preliminary design drawings.
    1.8. Schedule of builder's work, special provisions and special attendance by others.
    1.9. Examples of standard documentation from which project quality plan will be prepared.
    1.10. Preliminary fabrication and installation method statements and programme.
    1.11. Schedule of products and finishes with a design life expectancy less than that specified in clause 440, with proposals for frequencies and methods of replacement.
    1.12. Proposals for replacing damaged or failed products.
    1.13. Areas of non-compliance with the specification.

Types of curtain walling

110 Curtain walling

1. Description: Glazed curtain wall system, sizes and configurations as indicated on 31 series design drawings.
2. Supporting structure: Reinforced concrete frame or load-bearing steel frame sections.
3. Curtain walling system
    3.1. Manufacturer: Aluprof UK / Cortizo.

3.2. Type: Stick system, drained and ventilated.

4. Internal framing member
   4.1. Material: Aluminium.
   4.2. Finish: Polyester powder coated as section Z31.
      4.2.1. Colour/ texture: RAL 8004, satin.
      4.2.2. Minimum film thickness: 40 micrometres.
5. External cover cap
   5.1. Material: Aluminium.
   5.2. Finish: Polyester powder coated as section Z31.
      5.2.1. Colour/ texture: TBC.
      5.2.2. Minimum film thickness: 40 micrometres.
      5.2.3. Gloss: 30%.
6. Glazing: As section L40.
7. Glazing system: Gaskets, cover plate fixed.
8. Panel/ facing type: Aluminium infill panels, external cover plate fixed.
   8.1. External material: Aluminium sheet.
   8.2. External finish: Polyester powder coated.
   8.3. Internal material: Aluminium sheet.
   8.4. Internal finish: Polyester powder coated as section Z31.
   8.5. Core insulation: Mineral wool with foil backing to achieve weighted U-Value as per Services Engineer's information.
9. Accessories:
   9.1. General: Flashings, cills and other perimeter trims as per design drawings.
   9.2. EPDM: Provided to the full perimeter for weatherproofing and air tightness. Refer to 21 series detail drawings.
   9.3. Spacers: Black aluminium spacers fitted as per manufacturer's standard.
   9.4. Gaskets: Black, material and fitting as per manufacturer's standard .
10. Incorporated components: Doorsets as clause 135
    Louvres as clause 140
11. Other requirements: Back box sizes to be of consistent depth to all ceiling / floor finishes and the screen perimeter. Maximum depth not to exceed 280mm.

135 Doors

1. Description: Integrated aluminium framed glazed doorsets.
2. Manufacturer: Aluprof UK / Cortizo.
3. Material: Aluminium.
4. Finish: Polyester powder coated as section Z31.
   4.1. Colour/ texture: RAL 8004, satin.
   4.2. Minimum film thickness: 40 micrometres.
5. Glazing: As section L40.
6. Fixing: Curtain wall adaptor.
7. Performance criteria: Refer to 31 series door schedules.
8. Other requirements: Refer to 31 series door schedules and design drawings.

140 Louvres

1. Description: Integrated louvre panels to front of house curtain walling.

2. Manufacturer: Aluprof UK / Cortizo.
3. Material: Aluminium.
4. Finish: Polyester powder coated as section Z31.
   4.1. Colour/ texture: RAL 8004, satin.
   4.2. Minimum film thickness: 40 micrometres.
5. Fixing: Concealed fixings to the curtain wall framing.
6. Other requirements: Refer to Services Engineer's information for free area requirements.

150 Materials specification

1. Minimum BRE 'Green Guide to Specification' online rating: Contractor's choice
2. Specification of glazing materials to be in accordance with guidance in CIRIA document ‘Guidance on glazing at height’.

General requirements/ preparatory work

210 Design

1. Curtain walling and associated features: Complete the detailed design. Submit before commencement of fabrication.
2. Related works: Coordinate in the detailed design.

215 Design proposals

1. Submission of alternative proposals: Preliminary design drawings indicate intent. Other reasonable proposals will be considered.

220 Specification

1. Compliance standards: BS EN 13830 and The Centre for Window and Cladding Technology (CWCT) 'Standard for systemised building envelopes'.
2. Reference information: For the duration of the contract, keep available at the design office, workshop and on site copies of:
   2.1. The CWCT 'Standard for systemised building envelopes'.
   2.2. Publications invoked by the CWCT 'Standard for systemised building envelopes'.

230 Information to be provided during detailed design stage

1. Submit the following curtain walling particulars
   1.1. A schedule of detailed drawings and dates for submission for comment.
   1.2. A schedule of loads that will be transmitted from the curtain walling to the structure.
   1.3. Proposed fixing anchor details relevant to structural design and construction.
   1.4. A detailed testing programme in compliance with the main contract master programme.
   1.5. A detailed fabrication and installation programme in compliance with the main contract master programme.
   1.6. Proposals to support outstanding applications for Building Regulation consents or relaxations.

232 Quality plan

1. Requirement: Submit during detailed design.
2. Content: In accordance with BS EN ISO 9001 and including the following:
   2.1. Name of the quality manager.
   2.2. Quality assessment procedures.

2.3. Inspection procedures to be adopted in checking the work.
2.4. Stages at which check lists will be used and samples of the lists.
2.5. List of work procedures on the correct use of materials or components, both off site and on site.
2.6. List of product information with latest revisions.
2.7. Subcontractors involved in the work.
2.8. Subcontractors' quality plans.
2.9. Storage, handling, transport and protection procedures.
2.10. Procedure for registering and reporting non compliances.
2.11. Maintenance procedures and calibration records.
2.12. Certification that completed work complies with specification.
2.13. Check list register to ensure all items have been inspected and non compliances discharged.

235 Information to be provided before commencement testing or fabrication of curtain walling

1. Submit the following curtain walling particulars
   1.1. Detailed drawings to fully describe fabrication and installation.
   1.2. Detailed calculations to prove compliance with design/ performance requirements.
   1.3. Project specific fabrication, handling and installation method statements.
2. Certification for incorporated components manufactured by others confirming their suitability for proposed locations in the curtain walling.
3. Recommendations for safe dismantling and recycling or disposal of products.

250 Product samples

1. General: Before commencing detailed design, submit labelled samples of: proposed curtain wall framing and glazing elements .

260 Samples of fixings

1. General: During detailed design, submit labelled samples of each type of fixing anchor, including casting-in restraints and shims, together with manufacturers' recommended torque figures.

270 Fabrication samples

1. General: During detailed design, submit samples of: proposed curtain wall framing and glazing elements .
   1.1. Obtain approval of appearance before proceeding.

Design/ performance requirements

305 CWCT ‘Standard for systemised building envelopes’

1. General: Unless specified or agreed otherwise comply with:
   1.1. Part 2 - 'Loads, fixings and movement'.
   1.2. Part 3 - 'Air, water and wind resistance'.
   1.3. Part 4 - 'Operable components, additional elements and means of access'.
   1.4. Part 5 - 'Thermal, moisture and acoustic performance'.
   1.5. Part 6 - 'Fire performance'.
   1.6. Part 7 - 'Robustness, durability, tolerances and workmanship'.

2. Project performance requirements specified in this subsection: Read in conjunction with CWCT performance criteria.

313 Integrity

1. Requirement: The curtain walling must resist wind loads, dead loads and design live loads, and accommodate deflections and movements without damage.
2. Design wind pressure: Calculate in accordance with: BS EN 1991-1-4 and National Annex.
3. Impact performance:

   Include details of impact performance in submittal of test data.

320 Deflection under dead loads

1. Requirement: Framing members parallel to the curtain walling plane must not:
   1.1. Reduce glass bite to less than 75% of design dimension.
   1.2. Reduce edge clearance to less than 3 mm between members and immediately adjacent glazing units, panel/ facing units or other fixed units.
   1.3. Reduce clearance to less than 2 mm between members and movable components such as doors and windows.

325 Deflection under wind load

1. Requirement: To CWCT 'Standard for systemised building envelopes' clause 3.5 2 and the following additional requirements: As per Structural Engineer's information.
2. Additional stiffness to CWCT 'Standard for systemised building envelopes' clause 3.5 4.2: Not allowed.

330 General movement

1. Requirement: Curtain walling must accommodate anticipated building movements as follows: As per Structural Engineer's information .

332 Appearance and fit

1. Requirement: Design curtain walling system:
   1.1. To ensure position and alignment of all parts and features as shown on preliminary design drawings.
   1.2. To accommodate deviations in the primary support structure.
2. Primary support structure: Before commencing installation of curtain walling system, carry out survey sufficient to verify that required accuracy of erection can be achieved.
   2.1. Give notice: If the structure will not allow the required accuracy or security of erection.
   2.2. Design tolerances: Refer to Structural Engineer's information.
3. Curtain wall envelope zone tolerances
   3.1. Width: To be agreed.
      3.1.1. Critical reference location: External façade boundary.
4. Maximum permitted component and installation tolerances: ±2 mm deviation within a single storey/bay. ±5 mm overall.

335 Thermal movement – service temperature ranges

1. Requirement: To CWCT 'Standard for systemised building envelopes' clause 2.7.2 amended and/ or with the addition of the following: No additions.

340 Air permeability

1. Requirement: Excluding integrated door sets, permissible air leakage rates of 1.5 m³/hr/m² for fixed lights and 2.0 m³/hr/lin.m for opening lights must not be exceeded when the curtain walling is subjected to the peak test pressure.
2. Permeability class to BS EN 12152: A4
   2.1. Peak test pressure: 600 Pa

345 Air permeability exfiltration

1. Requirement: The maximum permissible air exfiltration rate through the curtain walling system must not exceed: that stated in the Service Engineer's information.

350 Water penetration

1. Watertightness class to BS EN 12154: R7.
   1.1. Peak test pressure: 600 Pa (excluding door thresholds).
2. Additional requirements: Underside of any transom not to be wetted at peak test pressure.

370 Thermal properties

1. Method of calculating the thermal transmittance (U-value) of curtain walling/ each zone of curtain walling: Weighted U-value.
2. Average U-value of curtain walling: Refer to Services Engineer's information.
3. Curtain wall zone interfaces: Co-ordinate to achieve required average U-value.
4. Method for assessing thermal transmittance (U-value) of assemblies: By calculation in accordance with CWCT standard.

380 Solar and light control

1. Total solar energy transmission
   1.1. Maximum g-value - glazing only: Refer to Services Engineer's information.
2. Visible light transmission
   2.1. Minimum light transmission - glazing only: Refer to Services Engineer's information.

385 Thermal stress in glazing

1. Glass panes/ units: Must have adequate resistance to thermal stress generated by orientation, shading, solar control and construction.

390 Avoidance of condensation

1. Requirement: Notional psychrometric conditions under which condensation must not form on building interior surfaces of framing members or any part of infill panels/ facings are:
   1.1. Notional outdoor psychrometric conditions as BS 5250.
   1.2. Notional indoor psychrometric conditions
      1.2.1. Temperature: 20°C
      1.2.2. Relative humidity: 55%
      1.2.3. Vapour pressure: 1.28 kPa

410 Sound transmittance

1. Minimum weighted sound reduction index (Rw) to BS EN ISO 717-1
   1.1. Between internal and external surfaces of curtain walling: Refer to Acoustics Specialist's information.
2. Minimum weighted standardized level difference (DnTw) to BS EN ISO 717-1

2.1. Between adjacent floors abutting curtain walling: Refer to Acoustics Specialist's information.

2.2. Between adjacent rooms on same floor abutting curtain walling: Refer to Acoustics Specialist's information.

426 Reaction to fire of curtain walling

1. Standard: To BS EN 13501-1 and the UK Build Regulations where guidance in the Approved Documents have superseded the guidance in BS EN 13501-1.
   1.1. Class: Refer to Fire Engineer's information.

430 Fire stopping

1. Locations: At junctions of curtain walling with compartment or separating walls and floors.
2. Materials and methods of fixing: To ensure fire resistance not less than that specified for compartment or separating walls and floors when tested from both sides.

436 Doors and other access facilities

1. Performance criteria: To CWCT 'Standard for systemised building envelopes', part 3
2. Access facilities designated for use by disabled persons: As design drawings.
3. Strength and durability: To CWCT 'Standard for systemised building envelopes' clause 4.3.3.
   3.1. Forces and tests: To BS EN 12400, Class 8
4. Security
   4.1. Applicable doors: Refer to 31 series door schedules.
   4.2. Security rating: TBC

437 Louvres

1. Performance classification to BS EN 13030.
   1.1. Discharge operation: As per Services Engineer's information
   1.2. Water penetration class: As per Services Engineer's information.
   1.3. Discharge/ entry loss coefficient class: As per Services Engineer's information.

440 Durability

1. Relevant agents or degradation mechanisms: As described by BS 7543, Annex A
2. Design life of the curtain walling system: Not less than 25 years
3. Secondary components: Submit details together with required maintenance regime, replacement periods and methods of replacement.

445 Lightning protection system

1. Curtain wall components used as part of lightning protection system: None.

450 Safety

1. Finished surfaces of curtain walling: Accessible internal and external areas must not:
   1.1. Have irregularities capable of inflicting personal injury.
   1.2. Release irritant or staining substances.

Breeam performance requirements - Not Used

Testing

510 Comparison (type) testing

1. Requirement: To CWCT 'Standard for systemised building envelopes', part 8.
2. Test results and reports: Before commencement of curtain walling fabrication and installation, submit proof of compliance with this specification.

520 Project testing (site)

1. Test results and reports: Before installation of general areas of curtain walling, submit proof of compliance with this specification.

530 Testing authority

1. Requirement: Project testing must be carried out by a United Kingdom Accreditation Service (UKAS) approved independent laboratory.

630 Site spray bar test

1. Requirement: To CWCT 'Standard for systemised building envelopes', 'Standard test methods for building envelopes' Section 10.
   1.1. Area to be tested: Typical bay.

635 Site hose test

1. Requirement: To CWCT 'Standard for systemised building envelopes' Section 8.16.2, 'Standard test methods for building envelopes' Section 9.
   1.1. Joints to be tested: Typical joint constructions.

655 Wind load fatigue test, small specimen

1. Requirement: To CWCT 'Standard for systemised building envelopes', 'Standard test methods for building envelopes' Section 14.
   1.1. Test sequence: As CWCT 'Standard for systemised building envelopes' Table 8.1

Products

710 Aluminium alloy framing sections

1. Standard: To relevant parts of BS EN 515, BS EN 573, BS EN 755 and BS EN 12020.
2. Alloy, temper and thickness: Suitable for the application and specified finish.
3. Structural members: To BS EN 1999-1-1.

712 Aluminium alloy sheet

1. Standards: To relevant parts of BS EN 485, BS EN 515 and BS EN 573.
2. Alloy, temper and thickness: Suitable for the application and specified finish.

730 Mechanical fixings

1. Stainless steel: To BS EN ISO 3506, grade A2 generally, grade A4 when used in severely corrosive environments.
2. Carbon steel: To BS 4190 and suitable for galvanizing or other protective coating.
3. Aluminium brackets, rivets and shear pins: To relevant parts of BS EN 755.

732 Adhesives

1. General: Not degradable by moisture or water vapour, or exposure to UV light.

735 Fixing anchors

1. Type and use: Reviewed and approved by fixing manufacturers. Submit confirmatory information on request.
2. Dimensions: Not less than recommended by their manufacturers.
3. Adjustment capability: Sufficient in three dimensions to accommodate building structure and curtain walling fabrication/ installation tolerances.

737 Glass generally

1. Standards: To BS 952 and relevant parts of:
   1.1. BS EN 572 for basic soda lime silicate glass.
   1.2. BS EN 1096 for coated glass.
   1.3. BS EN 1748 for borosilicate glass.
   1.4. BS EN 1863 for heat-strengthened soda lime silicate glass.
   1.5. BS EN 12150 for thermally toughened soda lime silicate glass.
   1.6. BS EN 13024 for thermally toughened borosilicate glass.
   1.7. BS EN ISO 12543 for laminated glass.
2. Selection of glass type and thickness in accordance with recommendations of CIRIA publication ‘Guidance on glazing at height’.
3. Glass quality: Clean and free from obvious scratches, bubbles, cracks, ripplings, dimples and other defects.
4. Glass edges: Generally undamaged. Shells and chips not more than 2 mm deep and extending not more than 25 mm across the surface are acceptable if ground out.

739 Dimensional tolerances on glass

1. Description: Integrated glass units.
2. Measurement of tolerances: Before any thermal toughening/ heat-strengthening.
3. Pane dimensions less than 1500 mm
   3.1. For 3 to 6 mm-thick glass: ± 1.0 mm.
   3.2. For 8 to 12 mm-thick glass: ± 1.5 mm.
   3.3. For 15 mm-thick glass: ± 2.0 mm.
   3.4. For 19 mm and 25 mm-thick glass: ± 2.5 mm.
4. Pane dimensions more than 1500 mm
   4.1. For 3 to 6 mm-thick glass: ± 1.5 mm.
   4.2. For 8 to 12 mm-thick glass: ± 2.0 mm.
   4.3. For 15 mm-thick glass: ± 2.5 mm.
   4.4. For 19 mm and 25 mm-thick glass: ± 3.0 mm.
5. Pane squareness: Not more than 4 mm difference in diagonal measurements.

741 Distortional tolerances on glass

1. Description: Integrated glass units.
2. Measurement of tolerances: After any thermal toughening/ heat-strengthening.
3. Maximum bow: 0.2% of pane dimension.
4. Maximum roller wave

4.1. For 3 to 5 mm-thick glass: 0.5 mm.
4.2. For 6 to 10 mm-thick glass: 0.3 mm.
4.3. For 12 mm and thicker glass: 0.15 mm.

5. Maximum edge dip
5.1. For 3 to 5 mm-thick glass: 0.8 mm.
5.2. For 6 to 10 mm-thick glass: 0.5 mm.
5.3. For 12 mm and thicker glass: 0.25 mm.

742 Heat-soaked thermally toughened glass

1. Standard: To BS EN 14179.
1.1. Holding period: 2 hours
2. Locations of heat-soaked glass: Refer to 31 series drawings.

745 Insulating glass units

1. Standard and labels for hermetically sealed units: To BS EN 1279.
2. Label: Each pane.
3. Colour of aluminium perimeter spacers: Black
4. Perimeter taping: Not to be used.
5. Perimeter seals
5.1. Resistant to UV light degradation on exposed edges.
5.2. Compatible with structural, assembly and weather sealants.

750 Infill panels/ Facings

1. Tolerances
1.1. Deviation in size (maximum): ± 1 mm.
1.2. Deviation in flatness from plane per 2 m length (maximum): ± 1 mm.
2. Rigidity: Adequate to comply with design/ performance requirements.
3. Fire performance: BS EN 13501-1, Class A2-s1, d0 or better

760 Gaskets

1. Material
1.1. Noncellular rubber to BS 4255-1.
1.2. Cellular rubber to ASTM-C509-06.
2. Continuity: Outer gaskets of single front sealed curtain walling systems and inner gaskets of drained and ventilated or pressure equalized curtain walling systems must be formed in a complete frame with sealed joints. Vulcanized rubber gaskets must have factory moulded corner joints.
3. Durability: Resistant to oxidation, ozone and UV degradation.
4. Colour: Black.

765 Weatherstripping of opening units

1. Material
1.1. Noncellular rubber to BS 4255-1.
1.2. Cellular rubber to ASTM-C509-06.
1.3. Polypropylene woven pile, silicone treated.

2. Attachment: Fixed in undercut grooves in framing sections using preformed corners, with any joints in the length.

770 General sealants

1. Selection: In accordance with BS 6213 from:
   1.1. Silicone.
   1.2. One part polysulfide.
   1.3. Two parts polysulfide.
   1.4. One or two parts polyurethane.
2. Classification and requirements: To BS EN ISO 11600.
3. Reaction to contact products and finishes: Stable and compatible.

772 Curtain walling joint assembly sealants

1. Material: One part, low modulus silicone to BS EN ISO 11600, type F or G. Neutral curing where in contact with or close proximity to other products that may be adversely affected by acetoxy curing.
2. Manufacturer: Contractor's choice

780 Thermal insulation

1. Material: Mineral wool boards to BS EN 13162
   1.1. Recycled content: Contractor's choice
   1.2. Properties: Durable, rot and vermin proof and not degradable by moisture or water vapour.
2. Fixing: Attached to or supported within the curtain walling so as not to bulge, sag, delaminate or detach during installation or in situ during the life of the curtain walling.

785 Air and vapour control layer

1. Acceptable materials
   1.1. Aluminium alloy.
   1.2. Carbon steel, galvanized or protective-coated.
   1.3. Stainless steel.
   1.4. Reinforced membranes: Foil, plastics or rubbers, protected both sides by rigid facings/ linings.
2. Location: Warm side of thermal insulation.
3. Integrity: Continuous, free from gaps and sealed at joints.

Finishes

810 Protective coating of carbon steel framing sections/ Reinforcement

1. Treatment: One of the following to all surfaces:
   1.1. Hot dip galvanized to BS EN ISO 1461.
   1.2. An appropriate equivalent coating to BS EN ISO 12944-5 or BS EN ISO 14713-1, -2 and -3.

820 Protective coating of carbon steel mechanical fixings

1. Treatment: One of the following to all surfaces:
   1.1. Hot dip galvanized to BS EN ISO 1461.
   1.2. Sherardized to BS 7371-8, Class 30 coating thickness and passivated.

1.3. Zinc plated to BS EN ISO 2081, coating designation Fe//Zn//C for an iridescent (yellow passivate) chromate conversion coating or Fe//Zn//D for an opaque (olive green) chromate conversion coating.

830 Powder-coating

1. Requirement: As section Z31.

Fabrication and installation

910 Generally

1. Electrolytic corrosion: Prevent. Submit proposed methods.
2. Fixings: Concealed unless indicated on detailed drawings. Where exposed they must match material and finish of the products fixed.
3. Fabrication: Machine cut and drill products in the workshop wherever possible.
4. Identification of products: Mark or tag to facilitate identification during assembly, handling, storage and installation. Do not mark surfaces visible in the completed installation.

912 Metalwork

1. Requirement: As section Z11, unless specified otherwise in this section.

915 Glazing

1. Requirement: As section L40, unless specified otherwise in this section.
2. Directional patterned/ wired glass: Generally fix parallel to surround and align adjacent panes where seen together at close quarters.

917 Fixings/ Adhesives application

1. Requirement: As section Z20, unless specified otherwise in this section.

920 Sealant application

1. Requirement: As section Z22, unless specified otherwise in this section.

930 Assembly

1. General: Carry out as much assembly as possible in the workshop.
2. Joints (other than movement joints): Rigidly secured, reinforced where necessary and fixed with hairline abutments.
3. Displacement of components in assembled units: Submit proposals for reassembly on site.

955 Fixing anchor installation

1. Site drilling or cutting into structure: Submit proposals for positions other than shown on detailed drawings.
2. Concrete supporting structure
   2.1. Cast-in inserts: Provide detailed locational information. Protect cavities in inserts from entry of concrete.
   2.2. Edge fixing distances: Not less than recommended by fixing anchor manufacturers.
3. Corrective fabrication: Minimize. Where necessary, submit proposals.

965 Preliminary curtain walling installation

1. Requirement: Complete an area for inspection and approval of appearance as follows: TBC, in line with construction programme.

970 Curtain walling installation

1. Securing to fixing anchors: Bolt holes through spigots and holes through mullion restraint brackets to be drilled on site.
2. Tightening mechanical fasteners: To manufacturer's recommended torque figures. Do not overtighten fasteners intended to permit differential movement.
3. Protective coverings: Remove only where necessary to facilitate installation and from surfaces that will be inaccessible on completion.

975 Welding

1. In situ welding: Permitted, subject to completion of and compliance with a 'hot work permit' form

978 Installing fire and smoke stops

1. Fire and smoke stops: To be located at all junctions between the curtain wall and compartment or separating walls and floors. To be installed strictly in accordance with manufacturers' guidelines and as recommended in CWCT Technical Note TN 98.
2. Installer qualification: To be a member of a UKAS-accredited installer scheme.

980 Interfaces

1. Flashings, closers, etc: Locate and form correctly to provide weathertight junctions with the curtain walling.

982 Ironmongery

1. Assembly and fixing: Accurately, using fasteners with matching finish supplied by ironmongery manufacturer.
2. Completion: Check, adjust and lubricate as necessary to ensure correct functioning.

985 Maintenance

1. Maintenance manual: Incorporate details within the Building Manual in accordance with CWCT 'Standard for systemised building envelopes' clause 7.6.1.

Ω End of Section

H72
Aluminium strip/ sheet fully supported roof and wall coverings/ flashings

Clauses

100 Section requirements

1. The works shall comply with the A Section, other applicable Work Sections and the applicable Z Sections of this Architectural Specification.
2. This section shall be read in conjunction with other project-related specifications, reports, documentation and design drawings.
3. Design responsibility:
    3.1. Descriptive: This is a design intent and performance-based section that the Contractor/Sub-Contractor must comply with when undertaking the detailed design to complete the design solution. The Contractor/Sub-Contractor retains full responsibility for completing the detailed design, complying with the performance criteria and the execution of the works.

Types of aluminium work

400 Metal copings AMT-301

1. Description: Pressed aluminium copings to parapets.
2. Aluminium: Coated sheet/ strip, as clause 525.
    2.1. Alloy designation: Manufacturer's standard, suitable for the specified finish.
    2.2. Temper: Manufacturer's standard, suitable for the specified finish.
    2.3. Finish: Polyester powder coated as section Z31, RAL 8004.
    2.4. Thickness: 3mm.
3. Dimensions
    3.1. Lengths: Not more than 3m.
4. Fixing: Proprietary metal fixing system suitably spaced to provide adequate robustness for abseiling.
5. Other requirements:: System to include necessary falls and drip details.

401 Metal cills and flashings

1. Description: Pressed aluminium flashings to form cills and junction details.
2. Aluminium: Coated sheet/ strip, as clause 525.
    2.1. Alloy designation: Manufacturer's standard, suitable for the specified finish.
    2.2. Temper: Manufacturer's standard, suitable for the specified finish.
    2.3. Finish: Polyester powder coated as section Z31, RAL colour to match surrounding panel finish.
    2.4. Thickness: 3mm.
3. Dimensions
    3.1. Lengths: Not more than 3m, with end-to-end joints lapped not less than 100mm.
    3.2. Cover to roofing upstand: Not less than 75mm, with bottom edge welted 15mm.
4. Fixing: Proprietary metal fixing system to suit each installation location.
5. Other requirements:: Systems to include necessary falls and drip details.

470 Miscellaneous flashings

1. Description: Any and all requirements for flashings as shown on detailed design drawings.
2. Aluminium: Coated sheet/ strip, as clause 525.
   2.1. Alloy designation: Manufacturer's standard.
   2.2. Temper: Manufacturer's standard.
   2.3. Finish: Polyester powder coated as section Z31, colour to match adjoining façade panels.
   2.4. Thickness: Manufacturer's recommendation to suit application.
3. Dimensions
   3.1. Lengths: Not more than 3 m.
4. Fixing: Welt top and bottom edges, and secure with clips at 450 mm centres

General requirements/ preparatory work

510 Workmanship generally

1. Standard: Generally to BS EN 14783, BS EN 507, CP 143-15 and latest edition of the Federation of Traditional Metal Roofing Contractors (FTMRC) publication UK guide to good practice in fully supported metal roofing and cladding.
2. Fabrication and fixing: To provide a secure, free-draining and completely weathertight installation.
3. Operatives: Trained in the application of aluminium coverings/ flashings. Submit records of experience on request.
4. Measuring, marking, cutting and forming: Prior to assembly wherever possible.
5. Marking out: With pencil, chalk or crayon. Do not use scribers or other sharp instruments without approval.
6. Folding: With mechanical or manual presses to give straight, regular and tight bends, leaving panels free from ripples, kinks, buckling and cracks. Use hand tools only for folding details that cannot be pressed.
7. Surface protection: Fully coat surfaces to be embedded in concrete or mortar with high build bitumen-based paint, after folding.
8. Sharp metal edges: Fold under or remove as work proceeds.
9. Joints: Do not use sealants to attain waterproofing.
10. Finished aluminium work: Fully supported, adequately fixed to resist wind uplift and able to accommodate thermal movement without distortion or stress.
    10.1. Protection: Prevent staining, discolouration and damage by subsequent works.

515 Welding

1. In situ welding: Permitted subject to completion of a 'hot work permit' form and compliance with its requirements.

520 Aluminium strip/ sheet

1. Standard: To BS EN 14783.
   1.1. Stamped or labelled with alloy designation, temper, finish and thickness.
2. Manufacturer: Contractor's choice

525 Coated aluminium strip/ sheet

1. Standard: To BS EN 14783 and BS EN 1396.
2. Manufacturer: Contractor's choice

535 Integrity of aluminium

1. Requirement: Design coverings/ flashings, methods of attachment and fastener spacing to prevent loss of weathertightness and permanent deformation due to wind pressure or suction.
2. Wind loads: Contractor's design of facades as section H92.
3. Structural requirements
   3.1. Generally: As per Structural Engineer's information.
4. Design: Complete in accordance with the designated code of practice to satisfy specified performance criteria.

550 Lightning protection

1. Aluminium coverings: attach the following to a lightning protection system : Copings.
2. Electrical continuity: Provide between aluminium strips/ sheets via welting of joints.

555 Layout

1. Setting out of longitudinal and cross joints: Submit proposals.

560 Control samples

1. General: Supply samples of designated finishes for approval.
2. Size: Submit proposals.

610 Suitability of substrates

1. Condition: Dry and free of dust, debris, grease and other deleterious matter.

Fixing

710 Fixings for clips

1. Screws to concrete/ masonry substrates: Sherardized or zinc-plated steel or aluminium, for aluminium clips, to BS EN 14592. Stainless steel (austenitic) to BS EN 14592 for stainless steel clips.
   1.1. Diameter: Not less than 3.35 mm.
   1.2. Length: Not less than 25 mm.
   1.3. Washers and plastic plugs: Compatible with screws.
2. Screws to composite metal decks: Self-tapping, as recommended by the deck and aluminium manufacturer/ supplier for aluminium or stainless steel clips.

750 Clips for flashings/ cross joints

1. Material: Cut from the same alloy and thickness as that being secured.
2. Stainless steel (austenitic) clips: Cut from same thickness of metal as the aluminium being secured.
3. Dimensions
   3.1. Width: Not less than 50 mm.
   3.2. Length: Sufficient to suit detail.
4. Fixing: Secure each clip to the substrate with two fixings, not more than 50 mm from the edge of the strip/ sheet being fixed.

Jointing

810 Forming details

1. Folds and welts: Form without thinning or splitting the strip/ sheet.
2. Thermal movement: Form details with appropriate allowance for movement, without impairment of security at full expansion or contraction.

900 Submittals

1. General: Refer to section A33 for a detail summary of individual requirements for the below submittals:
   1.1. Control samples:
      1.1.1. Hand samples of the designated aluminium systems in the specified finish.
      1.1.2. Fixings: Submit labelled samples of each type of fixing.
   1.2. Mock-ups: Not required.
2. Evidence of compliance:
   2.1. All aluminium cladding systems shall be UKCA/CE marked.
   2.2. Submit the Declaration of Performance (DoP).
   2.3. Check the completed systems and provide assurance of compliance with the specified performance
   2.4. Format: Description of inspections, remedial works carried out and certification of compliance.
   2.5. Timing: At completion of installation.

910 Testing

1. General: Refer to section A39 for general testing requirements.
2. For the systems proposed, independently certified tests and Agrément certificates must be provided before manufacture, to provide evidence the systems meet the specified performance and quality requirements.
3. Testing will be required where independently certified tests and Agrément certificates cannot be provided and evidence of compliance. These tests must comply with applicable British Standards and UKAS requirements.

Ω End of Section

H92
Rainscreen cladding

Clauses

100 Section requirements

1. The works shall comply with the A Section, other applicable Work Sections and the applicable Z Sections of this Architectural Specification.
2. This section shall be read in conjunction with other project-related specifications, reports, documentation and design drawings.
3. Design responsibility:
    3.1. Descriptive: This is a design intent and performance-based section that the Contractor/Sub-Contractor must comply with when undertaking the detailed design to complete the design solution. The Contractor/Sub-Contractor retains full responsibility for completing the detailed design, complying with the performance criteria and the execution of the works.

Tendering

105 Information to be provided with tender

1. Submit the following cladding particulars
    1.1. Typical plan, section and elevation drawings at suitable scales.
    1.2. Typical detailed drawings at large scales, including flashing details at external openings.
    1.3. Technical information and certification demonstrating compliance with specification of proposed incorporated products and finishes, including support bracketry, thermal insulation, EPDMs, membranes, boards, fixings and sealants.
    1.4. Certification, reports and calculations demonstrating compliance with specification of proposed cladding.
    1.5. Proposals for connections to and support from the primary support structure.
    1.6. Proposals for primary support structure additional to that shown on preliminary design drawings.
    1.7. Schedule of builders' work, special provisions and special attendance by others.
    1.8. Examples of standard documentation from which project quality plan will be prepared.
    1.9. Preliminary fabrication and installation method statements and programme.
    1.10. Proposals for replacing damaged or failed products.
    1.11. Areas of non-compliance with specification.

Type(s) of rainscreen cladding

120 Aluminium rainscreen cladding

1. Description: External wall and facade system to all elevations of main building.
2. Primary support structure: Proprietary metal helping-hand bracketry, fixed back to structure at required centres.
3. Backing wall: Dry lining on steel frame system.
    3.1. Thermal insulation: As clause 775
    3.2. Air and vapour control layer: As clause 780
    3.3. Breather membrane: As clause 785
4. Rainscreen cladding system
    4.1. Manufacturer: Contractor's choice

4.2. Type: Drained and back-ventilated.

4.3. Requirement: Include products, fixings and interfaces necessary to complete the fabrication and installation. Performance criteria to comply with design/ performance requirements and testing subsections.

5. Reaction to fire : As clause 795
6. Rainscreen panel: As clause 795
7. Secondary support/ framing system: To be specified by the cladding specialist.
8. Air gap: Not less than 25 mm.
9. Cavity barriers/ closers
   9.1. Horizontal: As clause 790
   9.2. Vertical: As clause 790
10. Incorporated components:
    - Windows, doors and curtain walling as per 31 series drawings.
    - Louvres as per 21 series drawings
    - Ventilation ductwork terminations (perforation to select panels at required locations - refer to 21 series drawings)
11. Other requirements:
    - Sound insulation performance requirements as clause 460. Read in conjunction with specialist acoustics report.
    - Fire performance requirements as clause 470. Read in conjunction with specialist fire strategy report.
12. Verification:
    12.1. Submittals: All relevant product data sheets, proof of certifications and associated test data for individual components and the system as a whole.
    12.2. Timing: To comply with detail design and construction programme.

130 Major non-standard components

1. Description: To include integration and design interfaces between primary rainscreen cladding panels and other required systems including windows and curtain walling.
2. Manufacturer: Contractor's choice
3. Fire performance requirements: Fire performance of rainscreen cladding – as clause 470.
4. Material: Aluminium jamb/soffit flashings
5. Finish: Polyester powder coated as section Z31, colour to match surrounding façade elements as shown on design intent drawings.
6. Fixing: Manufacturer's recommendation.
7. Other requirements: To maintain thermal and acoustic performance requirements.

140 Integration with non-standard components

1. Rainscreen cladding to integrate Mechanical and Electrical systems/equipment including MVHR ductwork terminations, signage and lighting as shown on design drawings.

General requirements/ preparatory work

210 Rainscreen cladding system design

1. Rainscreen cladding system and associated features: Complete detailed design in accordance with this specification and the preliminary design drawings and submit before commencement of fabrication.
2. Standard: In accordance with the CWCT Standard for systemised building envelopes.

2.1. Reference information: For the duration of the contract, keep available at the design office, workshop and on site copies of:
   - The CWCT Standard for systemised building envelopes.
   - Plublications invoked by the CWCT 'Standard for systemised building envelopes'.

3. Appearance and fit: Ensure that position and alignment of parts and features are as shown on preliminary design drawings. Accommodate deviations in the primary support structure.
4. Related works: Coordinate in the detailed design.
5. Detailed design: Complete and submit proposals for approval.
6. Submission of alternative proposals: Preliminary design drawings indicate intent. Other reasonable proposals will be considered.

230 Information to be provided during detailed design

1. Submittals:
   - A schedule of detailed drawings and dates for submission for comment.
   - A schedule of loads that will be transmitted from the rainscreen cladding to the structure.
   - Proposed fixing details and systems relevant to the structural design and construction, with methods of adjustment and tolerances.
   - A schedule of fabrication tolerances/ size tolerances.
   - A detailed testing programme in compliance with the main contract master programme.
   - A detailed fabrication and installation programme in compliance with the main contract master programme.
   - Proposals to support outstanding applications for Building Regulations consents or relaxations.
2. Timing: Submit during detailed design.

232 Quality management

1. Required documentation: Project specific method statement in accordance with CWCT Standard for systemised building envelopes and guidance in CWCT Technical Note 53.
2. Content: In accordance with BS EN ISO 9001, and including the following:
   2.1. Name of the quality manager.
   2.2. Quality assessment procedures.
   2.3. Inspection procedures to be adopted in checking the work.
   2.4. Stages at which check lists will be used, and samples of the lists.
   2.5. List of work procedures on the correct use of materials or components, both off site and on site.
   2.6. List of product information with latest revisions.
   2.7. Subcontractors involved in the work.
   2.8. Subcontractors' quality plans.
   2.9. Storage, handling, transport and protection procedures.
   2.10. Procedure for registering and reporting non-compliances.
   2.11. Maintenance procedures and calibration records.
   2.12. Certification that completed work complies with specification.
   2.13. Check list register to ensure that all items have been inspected and non-compliances discharged.
3. Timing: Submit during detailed design.

235 Information to be provided before commencement of testing or manufacture of rainscreen cladding system

1. Submittals:
    - Detailed drawings to fully describe fabrication and installation.
    - Detailed calculations to prove compliance with design/ performance requirements.
    - Project-specific fabrication, handling and installation method statements.
    - Certification for incorporated components manufactured by others, confirming their suitability for proposed locations in the rainscreen cladding.
    - Recommendations for spare parts for future repairs or replacements.
    - Recommendations for safe dismantling and recycling or disposal of products.
2. Timing: Submit during detailed design.

240 Product samples

1. General: Before commencing detailed design, submit labelled samples of: finished panel material of each occurring colour variety and perforation patterns to be used at MVHR terminations.

250 Samples of fixings

1. General: During detailed design, submit labelled samples of each type of fixing, together with manufacturers' recommended torque figures.

260 Fabrication samples

1. General: During detailed design, submit samples of: interface / corner details. Obtain approval of appearance before proceeding.

Design/performance requirements

335 Integrity

1. Requirement: The rainscreen cladding must resist wind loads, dead loads and design live loads, and accommodate deflections and movements without damage.
2. Design wind pressure: Calculate in accordance with BS EN 1991-1-4 and the National Annex to BS EN 1991-1-4 and BS 6262-1.
3. Impact performance: Include details of impact performance in submittal of test data.
4. Imposed loads
    4.1. Standard: In accordance with BS EN 1991-1-1 and NA to BS 1991-1-1.

360 Wind resistance – cyclic loading

1. Requirement: No reduction in the integrity of the rainscreen cladding must occur when subjected to the test sequence given in CWCT Standard for systemised building envelopes, clause 8.14.6.
2. Test method: As clause 665.
    2.1. Effective wind pressure: As CWCT 'Standard for systemised building envelopes', clause 2.2.5.1

370 Appearance and fit

1. Requirement: Design rainscreen wall to ensure position and alignment of all parts and features as shown on preliminary design drawings and accommodate deviations in the primary support structure.
2. Primary support structure: Before commencing installation of rainscreen cladding system, carry out survey sufficient to verify that required accuracy of erection can be achieved.
    2.1. Give notice: If the structure will not allow the required accuracy or security of erection.

2.2. Design tolerances: Refer to Structural Engineer's Movement and Tolerance Report.

380 General movement

1. Requirement: Rainscreen cladding must accommodate anticipated building movements as follows: Refer to Structural Engineer's Movement and Tolerance Report.

385 Thermal movement

1. Service temperature range: To CWCT Standard for systemised building envelopes, clause 2.7.2, Tables 2.2 and 2.3.

410 Air permeability

1. Permeability class: To BS EN 12152, Class A4.
   1.1. Peak test pressure: 600 Pa.
2. Air exfiltration rate (maximum): Refer to Services Engineer's inormation.

420 Water penetration

1. Watertightness
   1.1. Standard: To BS EN 12154.
   1.2. Class: Include details in submittal of test data.
2. Water leakage requirements: Insulation attached to backing wall not to be wetted at peak test pressure

425 Wind load serviceability and safety of rainscreen panels – cyclic wind loading

1. Method of determination: Test in accordance with CWCT 'Standard for systemised building envelopes', clause 8.14.6 to the regime given in Table 8.1

430 Thermal performance

1. Method of calculation: Weighted U-value.
2. U-value of rainscreen wall (average): As per Services Engineer's information.
3. Method for assessing thermal transmittance of assemblies: By calculation, in accordance with CWCT 'Standard for systemised building envelopes' clause 5.2.3.2.

450 Air and vapour control layer

1. Condensation risk within rainscreen wall: Determine using the method described in BS 5250. Where required, provide a suitable air and vapour control layer to ensure that damage and nuisance from condensation is reduced.

460 Acoustic performance – sound transmittance

1. Weighted sound reduction index (Rw) (minimum)
   1.1. Standard: To BS EN ISO 717-1.
   1.2. Requirement between internal and external surfaces of rainscreen clad wall: As per Acoustics Specialist information.
2. Weighted standardized level difference (DnT,w) (minimum)
   2.1. Standard: To BS EN ISO 717-1.
   2.2. Requirement between adjacent floors abutting rainscreen clad wall: As per Acoustics Specialist information.
   2.3. Requirement between adjacent rooms on same floor abutting rainscreen clad wall: As per Acoustics Specialist information.

3. Verification:
   3.1. Submittals: Relevant product data sheets, proof of certifications and test data.
   3.2. Timing: To comply with detail design and construction programme.

470 Fire performance

1. Standard: In accordance with the requirements of national Building Regulations, CWCT Standard for systemised building envelopes part 6, TN 113, TN 114 and TN 116.
2. Reaction-to-fire classification
   2.1. External surfaces: As per Fire Engineer's information.
   2.2. Cavity surfaces: As per Fire Engineer's information.
3. Fire resistance of cavity barriers and closers: As per Fire Engineer's information.
4. Verification of fire performance: As per Fire Engineer's information.

480 Fire performance – backing wall

1. Fire resistance
   1.1. Minimum periods and criteria: As per Fire Engineer's information.
2. Reaction to fire – internal face
   2.1. Class (minimum): As per Fire Engineer's information.

495 Durability

1. Relevant agents or degradation mechanisms: As described by BS 7543, Annex A.
2. Design life of the rainscreen cladding system: Not less than 25 years.
3. Secondary components: Submit details together with required maintenance regime, replacement periods and methods of replacement.

497 Lightning protection system

1. Rainscreen components used as part of lightning protection system: None.

Testing

510 Comparison (type) testing

1. Verification of performance
   1.1. Submit: Certification and reports satisfying CWCT 'Standard for systemised building envelopes'
2. Commencement of fabrication and installation of rainscreen cladding: Not until test results and reports showing compliance with this specification have been submitted.

665 Wind load fatigue test, small specimen

1. Test standard: To CWCT Standard test methods for building envelopes, part 14.
   1.1. Test sequence: As CWCT Standard for systemised building envelopes, Table 8.1.
   1.2. Effective wind pressure: As clause 360.

670 Testing of fixings

1. Test standard: To CWCT Standard test methods for building envelopes, part 19.
2. Test criteria
   2.1. Type: Ultimate load.
   2.2. Peak load: Not required.

680 Site spray bar test

1. Requirement: To CWCT Standard test methods for building envelopes, part 10.
   1.1. Area to be tested: Typical bay.

685 Site hose test

1. Requirement: To CWCT Standard test methods for building envelopes, part 9.
   1.1. Joints to be tested: Typical joint constructions.

Products

710 Aluminium alloy framing sections

1. Standards: To relevant parts of BS EN 755 alloy EN AW-6063, and suitable for the specified finish.
2. Structural members: To comply with BS EN 1999-1-1, BS EN 1999-1-3 and BS EN 1999-1-4.

712 Aluminium alloy sheet

1. Standards: To relevant parts of BS EN 485 and BS EN 573, and BS EN 515.
2. Alloy, temper and thickness: Suitable for the application and specified finish.

715 Carbon steel framing sections/ reinforcement

1. Standards: To the relevant parts of BS 7668, BS EN 10029, BS EN 10025 or BS EN 10210.
2. Thickness: Suitable for the application, and for galvanizing or other protective coating.

717 Carbon steel sheet

1. Standards: To the relevant parts of BS 1449-1, BS EN 10140 or BS EN 10149, or BS EN 10048, BS EN 10051, BS EN 10111, BS EN 10131, BS EN 10132, BS EN 10139, BS EN 10209 or BS EN 10268.
2. Grade and thickness: Suitable for the application, and for galvanizing or other protective coating.

720 Stainless steel sheet

1. Standards: To the relevant parts of BS EN ISO 9445, BS EN 10029, BS EN 10048, BS EN 10051or BS EN 10095.
2. Grade: To BS EN 10088-2, BS EN 10088-4, BS EN 10088-5, austenitic 1.4301 (304) generally, 1.4301 (316) when used externally or in severely corrosive environments.
3. Thickness: Suitable for the application.

730 Mechanical fixings – material requirements

1. Stainless steel: To the relevant part(s) of BS EN ISO 3506, Grade A2 generally, Grade A4 when used in severely corrosive environments.
2. Carbon steel: To BS 4190 and suitable for galvanizing or other protective coating.
3. Aluminium: To BS EN 755.

732 Adhesives

1. General: Not degradable by moisture or water vapour.

735 Fixings and fasteners

1. Type and use: Reviewed and approved by manufacturers. Submit confirmatory information on request.

2. Dimensions: Not less than recommended by their manufacturers.
3. Adjustment capability: Sufficient in three dimensions to accommodate primary support structure and rainscreen cladding fabrication/ installation tolerances.

760 Gaskets

1. Material:
    - Cellular rubber to ASTM-C509-06.
    - Noncellular rubber to BS 4255-1.
2. Durability: Resistant to oxidation, ozone and UV degradation.

765 Weatherstripping EPDM

1. Manufacturer: Contractor's choice.
2. Material:
    - Cellular rubber to ASTM-C509-06.
    - Noncellular rubber to BS 4255-1.
3. Reaction to fire (minimum): To BS EN 13501-1 Class A2-s1, d0.
4. Installation: Manufacturer's instructions.
   Fixed in undercut grooves in framing sections using preformed corners with any joints in the length.
5. Overlap with adjacent membranes/substrates: Manufacturer's recommendation.

770 General sealants

1. Selection: In accordance with BS 6213.
2. Classification and requirements: To BS EN ISO 11600.
3. Reaction to contact products and finishes: Stable and compatible.

775 Thermal insulation

1. Manufacturer: Contractor's choice.
2. Material: Mineral wool to BS EN 13162.
    2.1. Properties: Durable, rot and vermin proof and not degradable by moisture or water vapour.
3. Thickness: To suit thermal performance requirements.
4. Recycled content: Contractor's choice.
5. Fixing: Attached to the outer face or supported within the backing wall so as not to bulge, sag, delaminate or detach during installation or in situ during the life of the rainscreen cladding.
6. Verification:
    6.1. Submittals: Relevant product data sheets, proof of certifications and associated test data.
    6.2. Timing: To comply with detail design and construction programme.

780 Air and vapour control layer

1. Manufacturer: Contractor's choice
2. Reaction to fire (minimum): To BS EN 13501-1 Class A2-s1,d0.
3. Continuity: No breaks and with the minimum of joints.
    3.1. Penetrations and abutments: Seal to air and vapour control layer. If necessary, prime substrates to achieve full bond.
    3.2. Sheet laps: Not less than 150 mm, seal with tape. Prime substrates as necessary to achieve full bond.
4. Sheet tape: Double-sided sealant with vapour resistivity not less than the air and vapour control sheet.

5. Sheet repairs and punctures: Seal with lapped patch of air and vapour control membrane and continuous band of sealant tape along edges.
6. Verification:
    6.1. Submittals: Relevant product data sheets, proof of certifications and test data.
    6.2. Timing: To comply with detail design and construction programme.

785 Breather membrane

1. Manufacturer: Contractor's choice
2. Standard: To BS EN 13859-2.
3. Material: UV-durable underlay to BS EN 13859-2.
4. Reaction to fire (minimum): To BS EN 13501-1 Class B-s1, d0.
5. Continuity: No breaks. Minimize joints.
    5.1. Penetrations and abutments: Attach to breather membrane with tape. Achieve full bond.
    5.2. Laps: Not less than 150 mm, bond with tape. Achieve full bond.
6. Tape: As recommended by breather membrane manufacturer.
7. Repairs: Lapped patch of breather membrane material secured with continuous band of tape on edges.
8. Junctions at flashings, sills, gutters etc. Overlap and allow free drainage to exterior.
9. Verification:
    9.1. Submittals: Relevant product data sheets, proof of certifications and test data.
    9.2. Timing: To comply with detail design and construction programme.

790 Cavity barriers/ closers

1. Manufacturer: Contractor's choice
2. Standard: To BS EN 13162.
   Testing for 'open-state' cavity barriers to be in accordance with the Association for Specialist Fire Protection TGD19.
3. Material: Mineral wool, metal-foil-faced with continuous intumescent strip bonded to leading edge.
4. Fire resistance: As per Fire Strategy.
5. Properties: Ventilated.
6. Dimensions: To suit cavity widths detailed on 21 series drawings.
7. Recycled content: None permitted.
8. Verification:
    8.1. Submittals: Relevant product data sheets, proof of certifications and test data.
    8.2. Timing: To comply with detail design and construction programme.

795 Rainscreen panel

1. Manufacturer: Contractor's choice
2. Standard: To BS EN 573-3.
3. Type: Cassette.
4. Material: Aluminium alloy.
5. Reaction to fire: As per Fire Engineer's information.
6. Thickness: 3mm.
7. Finish/ colour: Polyester powder coated as section Z31.
    7.1. Panel 01: NCS 1020-Y60R, satin.
    7.2. Panel 02: RAL 3012, satin.

7.3. Panel 03: RAL 3022, satin.
7.4. Panel 04: NCS 4030-Y70R, satin.
7.5. Panel 05: RAL 8004, satin.
7.6. Panel 06: RAL 8007, satin.
7.7. Panel 07: RAL 9002, matt.

8. Minimum film thickness: 40 micrometres.
9. Other panel requirements: Panel to hold current BBA certification for use as part of a rainscreen cladding system.
   9.1. Integrity: The external cladding shall be capable of accommodating the impact loads for facade cleaning and maintenance without causing deflections or movements which will affect the infill panels
10. Panel fixing system: Through.
11. Panel fixings: Mechanical, fixings to match panel colour.
    11.1. Number and location: As required.
12. Joint type: Closed.
    12.1. Joint width: 20mm.
13. Verification:
    13.1. Submittals: Relevant product data sheets , proof of certifications and test data.
    13.2. Timing: To comply with detail design and construction programme.

Finishes

810 Protective coating of carbon steel framing sections/ reinforcement

1. Treatment:
   1.1. All surfaces to one of the following:
   - Hot-dip-galvanized to BS EN ISO 1461.
   - An appropriate equivalent coating to BS EN ISO 12944, and BS EN ISO 14713-1 and BS EN ISO 14713-2.

820 Protective coating of carbon steel mechanical fixings

1. Treatment:
   1.1. All surfaces to one of the following:
   - Hot-dip-galvanized to BS EN ISO 1461.
   - Sherardized to BS EN ISO 17668, Class 30 coating thickness, and passivated.

830 Powder coating

1. Requirement: As section Z31.

Fabrication and installation

910 Generally

1. Electrolytic corrosion: Take necessary measures to prevent.
2. Identification of products: Mark or tag to facilitate identification during assembly, handling, storage and installation. Do not mark surfaces visible in the complete installation.

912 Metalwork

1. Requirement: As section Z11, unless specified otherwise in this section.

922 Fixings/ adhesives application

1. Requirement: As section Z20, unless specified otherwise in this section.

925 Sealant application

1. Requirement: As section Z22, unless specified otherwise in this section.

930 Assembly

1. Location: Carry out as much assembly as possible in the workshop.
2. Joints: Other than movement joints and designed open joints, joints must be rigidly secured, reinforced where necessary and fixed with hairline abutments.
3. Displacement of components in assembled units: Submit proposals for reassembly on site.

960 Preliminary rainscreen cladding installation

1. Requirement: Complete an area of cladding for inspection and approval of appearance.

970 Rainscreen cladding installation

1. Tightening mechanical fasteners: To manufacturer's recommended torque figures. Do not overtighten fasteners intended to permit differential movement.
2. Protective coverings: Remove only where necessary to facilitate installation and from surfaces that will be inaccessible on completion.

975 Welding

1. In situ welding: Permitted, subject to completion of and compliance with a 'hot work permit' form.

980 Interfaces

1. Installation: Locate flashings, closers, etc. correctly, and neatly overlap cladding to form a weathertight junction.

985 Damage

1. Repairs: Do not repair cladding without approval.
    1.1. Approval: Will not be given where the proposed repair will impair performance or appearance.
2. Record of repairs: Prepare schedule, or record on drawings for inclusion in the maintenance manual.

995 Maintenance

1. Maintenance manual: Incorporate details within the building manual in accordance with CWCT Standard for systemised building envelopes, clause 7.6.1.

996 Submittals

1. General: Refer to section A33 for a detail summary of individual requirements for the below submittals:
    1.1. Control samples:
        1.1.1. Hand samples of each aluminium system in the specified finish.
        1.1.2. Fixings: Submit labelled samples of each type of fixing.
    1.2. Mock-ups: Not required.
2. Evidence of compliance:
    2.1. All aluminium cladding systems shall be UKCA/CE marked.

2.2. Submit the Declaration of Performance (DoP).

2.3. Check the completed systems and provide assurance of compliance with the specified performance

2.4. Format: Description of inspections, remedial works carried out and certification of compliance.

2.5. Timing: At completion of installation.

997 Testing

1. General: Refer to section A39 for general testing requirements.
2. For the systems proposed, independently certified tests and Agrément certificates must be provided before manufacture, to provide evidence the systems meet the specified performance and quality requirements.
3. Testing will be required where independently certified tests and Agrément certificates cannot be provided and evidence of compliance. These tests must comply with applicable British Standards and UKAS requirements.

Ω End of Section

L10
Windows/ rooflights/ screens/ louvres

Clauses

100 Section requirements

1. The works shall comply with the A Section, other applicable Work Sections and the applicable Z Sections of this Architectural Specification.
2. This section shall be read in conjunction with other project-related specifications, reports, documentation and design drawings.
3. Design responsibility:
   3.1. Descriptive: This is a design intent and performance-based section that the Contractor/Sub-Contractor must comply with when undertaking the detailed design to complete the design solution. The Contractor/Sub-Contractor retains full responsibility for completing the detailed design, complying with the performance criteria and the execution of the works.

General

120 Pre-construction survey

1. Procedure: Before starting work on designated items take site dimensions and use to ensure accurate fabrication.
2. Primary support structure: Carry out survey sufficient to verify that required accuracy and security of erection can be achieved.
3. Timing: Before fabrication.

140 Control samples

1. Procedure
   1.1. Finalize component details.
   1.2. Fabricate one of each of the following designated items as part of the quantity required for the project.
   1.3. Obtain approval of appearance and quality before proceeding with manufacturer of the remaining quantity.
2. Designated items: Aluminium framed fixed window system as clause 335.

Products

335 Aluminium windows

1. Description: Aluminium framed window systems as described on 31 series design drawings and schedules.
2. Standard: Non-fire-rated and/ or non-smoke-rated windows to BS EN 14351-1 and BS 4873
3. Exposure category to BS 6375-1/ design wind load: Manufacturer's standard
4. Finish as delivered: Polyester powder coating to BS EN 12206-1.
   4.1. Minimum film thickness: 40 micrometres.
   4.2. Colour: RAL 3012, satin.
   RAL 8004, satin.
   RAL 3022, satin.
   Refer to 21 series drawings for locations of varying panel colours.
5. Thermal performance (U-value maximum): As per Service Engineer's information.
6. Acoustic performance rating: As per Acoustic Specialist's information.

7. Fire performance
   7.1. Fire resistance: As per Fire Engineer's information.
   7.2. Reaction to fire: To BS EN 13501-1, Class B or better
8. Security rating: Refer to 31 series windows schedules.
9. Glazing details: As section L40.
   9.1. Beading: Manufacturer's standard.
10. EPDM: Allow for EPDM sealing of all junctions between window frame and the external wall construction. Minimum 150mm lap with breather membrane.
11. Other requirements: AOV windows required to ventilate protected fire lobbies/corridors. Refer to 31 series drawings & Services Engineer's information for locations and requirements.
12. Restrictors: Install to all opening windows limiting the opening to no more than 100mm.
13. Fixing: To structural SFS sections / concrete.
14. Verification:
    14.1. Submittals: Relevant product data sheets, proof of certifications and test data.
    14.2. Timing: In accordance with the detail design and construction programme.

490 Natural smoke and heat exhaust ventilators AMT-301

1. Manufacturer: Quanex Access Solutions or equal approved.
   1.1. Contact details
      1.1.1. Address: Innovation Drive
      Wolverhampton
      West Midlands
      United Kingdom
      WV9 5GA
      1.1.2. Telephone: 01284 701 696
      1.1.3. Web: https://www.quanex.com/
      1.1.4. Email: QASUK@QUANEX.COM
   1.2. Product reference: ESW-50REM SMOKE VENT
2. Standard: To BS EN 12101-2.
3. Arrangement: Flap.
4. Dimensions
   4.1. Length: 1488 mm.
   4.2. Width: 1488 mm.
5. Materials
   5.1. Ventilator
      5.1.1. Frame: Aluminium.
      5.1.2. Finish: Mill finish.
      5.1.3. Colour: Natural.
   5.2. Integral upstands
      5.2.1. Material: Double-skin aluminium, insulated.
      5.2.2. Finish: Mill finish.
      5.2.3. Colour: Natural.
6. Seals: Heavy extruded EPDM rubber gasket bonded to the cover interior to ensure a continuous seal when compressed to the top surface of the curb.
7. Curb: Standard.
8. Explosion relief smoke vent: Not required.

9. Maximum live load: Cover reinforced to support a minimum live load of 195 kg/m².
10. Deflection: 1/ 150th of the span (maximum).
11. Operating: A single linear actuator mounted on a pivoting carriage capable of opening the cover to the fire open position of 140º.
12. Cover: 3 mm aluminium with a 100 mm beaded flange with formed reinforcing members. Polyisocyanurate insulation of 50 mm thickness with a U-value of 0.47 W/m²K. Insulation to be fully covered and protected by an aluminium liner.
13. Hardware: Heavy pintle hinges; Curb mounted junction box with a terminal block enclosed for power cable connection.

Execution

710 Protection of components

1. General: Do not deliver components to site that cannot be installed immediately or placed in clean, dry-floored and covered storage.
2. Stored components: Stack them vertically or near-vertically on level bearers, separated with spacers to prevent damage by and to projecting ironmongery, beads, etc.

740 Corrosion protection

1. Surfaces to be protected: Aluminium alloy components in contact with ungalvanized steel, concrete or plaster.
2. Protective coating: Two coats of bitumen solution to BS 6949, EPDM or an approved mastic-impregnated tape.
    2.1. Timing of application: Before fixing components.

765 Window installation generally

1. Installation: Into prepared openings.
2. Gap between frame edge and surrounding construction
    2.1. Maximum: 10mm
3. Distortion: Install windows without twist or diagonal racking.

770 Damp-proof courses in prepared openings

1. Location: Ensure correct positioning in relation to window frames. Do not displace during fixing operations.

782 Fixing of aluminium frames

1. Standard: As section Z20.
2. Fasteners: Manufacturer's standard.
    2.1. Spacing: Manufacturer's standard.

810 Sealant joints

1. Description: To aluminium window systems.
2. Sealant
    2.1. Manufacturer: Contractor's choice
    2.2. Colour: As close as possible matched to the window frame.
    2.3. Application: As section Z22 to prepared joints. Finish triangular fillets to a flat or slightly convex profile.
    2.4. Verification:
        2.4.1. Submittals: Relevant product data sheets, proof of certifications and test data.

2.4.2. Timing: To comply with detail design and construction programme.

820 Ironmongery

1. Fixing: In accordance with any third-party certification conditions applicable. Assemble and fix carefully and accurately using fasteners with matching finish supplied by ironmongery manufacturer. Do not damage ironmongery and adjacent surfaces.
2. Checking/ adjusting/ lubricating: Carry out at completion and ensure correct functioning.

895 Verification on completion

1. Requirement: Evidence of compliance with performance requirements.
2. Method: Manufacturer's performance declarations and inspections of installations.
3. Submittals
   3.1. Format: Drawings, schedules, technical information, calculations and manufacturer's literature.
   3.2. Timing: To comply with detail design and construction programme.

900 Submittals

1. Refer to section A33 for a detailed summary of individual requirements for the submittals below:
   1.1. Fire performance evidence: Provide third-party certification of product conformity with the specified fire performance of each window system.
   1.2. Acoustic performance evidence: Provide third-party certification of product conformity with the specified acoustic performance for each sound attenuating window.
   1.3. Control samples:
      1.3.1. Hand sample of a typical framed window system including accessories.
      1.3.2. Samples of each type of seal
      1.3.3. Obtain acceptance of appearance and quality before proceeding with the manufacture of the remaining quantity.
      1.3.4. Clearly label all submitted samples.
2. Mock-ups: Not required.
3. Benchmarks: Complete storey height bay and obtain acceptance of appearance before proceeding.

950 Testing

1. General: Refer to section A39 for general testing requirements.
2. For the systems proposed, independently certified tests and Agrément certificates must be provided before manufacture, to provide evidence the systems meet the specified performance and quality requirements.
3. Approved installer validation: Test certification for windows/ assemblies to show proposals for meeting performance requirements. The certification shall cover frame materials, glass and glazing materials and their installation.
4. Testing will be required where independently certified tests and Agrément certificates cannot be provided as evidence of compliance. These tests must comply with applicable British Standards and UKAS requirements and the following:
   4.1. Window assemblies that fall outside the manufacturer's standard test coverages shall require independently conducted testing or a dedicated technical assessment carried out by a nationally recognised body.

Ω End of Section

L40
General glazing

General requirements

100 Section requirements

1. The works shall comply with the A Section, other applicable Work Sections and the applicable Z Sections of this Architectural Specification.
2. This section shall be read in conjunction with other project-related specifications, reports, documentation and design drawings.
3. Design responsibility:
    3.1. Descriptive: This is a design intent and performance-based section that the Contractor/Sub-Contractor must comply with when undertaking the detailed design to complete the design solution. The Contractor/Sub-Contractor retains full responsibility for completing the detailed design, complying with the performance criteria and the execution of the works.

111 Pre-glazing

1. Pre-glazing of components: Permitted.
2. Prevention of displacement: Submit details of precautions to be taken to protect glazing and compound/ seals during delivery and installation.
3. Defective/ displaced glazing/ compound/ seals: Reglaze components in situ.

130 Removal of glass/ plastics for reuse

1. Existing glass/ plastics and glazing compound, beads, etc.: Remove carefully, avoiding damage to frame, to leave clean, smooth rebates free from obstructions and debris.
2. Deterioration of frame/ surround: Submit report on defects revealed by removal of glazing.
    2.1. Affected areas: Do not reglaze until instructed.
3. Reusable materials: Clean glass/ plastics, beads and other components that are to be reused.

140 Material samples

1. Representative samples of designated materials: Submit before cutting panes.
    1.1. Sample size (minimum): 150 x 150 mm.
    1.2. Designated materials: All glazing types.
    1.3. Requirements: Visuals to remain consistent across all clear glazing types.

150 Workmanship and positioning generally

1. Glazing generally: In accordance with BS 6262 series.
2. Integrity: Glazing must be wind and watertight under all conditions with full allowance made for deflections and other movements.
3. Dimensional tolerances: Panes/ sheets to be within +/-2 mm of specified dimensions.
4. Materials
    4.1. Compatibility: Glass/ plastics, surround materials, sealers, primers and paints/ clear finishes to be used together to be compatible. Avoid contact between glazing panes/ units and alkaline materials such as cement and lime.
    4.2. Protection: Keep materials dry until fixed. Protect insulating glass units and plastics glazing sheets from the sun and other heat sources.

151 Preparation

1. Surrounds, rebates, grooves and beads: Cleaned and prepared by others.

155 Glass generally

1. Standards: To BS 952-1 and the relevant parts of:
   1.1. BS EN 572-9 for basic soda lime silicate glass.
   1.2. BS EN 1748-1-1 for borosilicate glass.
   1.3. BS EN 1748-2-1 for ceramic glass.
   1.4. BS EN 1863-2 for heat-strengthened soda lime silicate glass.
   1.5. BS EN 12150-2 for thermally toughened soda lime silicate safety glass.
   1.6. BS EN 12337 for chemically strengthened soda lime silicate glass.
   1.7. BS EN 13024-2 for thermally toughened borosilicate safety glass.
   1.8. BS EN 14449 for laminated glass and laminated safety glass.
2. Panes/ sheets: Clean and free from obvious scratches, bubbles, cracks, rippling, dimples and other defects.
   2.1. Edges: Generally undamaged. Shells and chips not more than 2 mm deep and extending not more than 5 mm across the surface are acceptable if ground out.

165 Heat-soaking of thermally toughened glass

1. Standard: To BS EN 14179-1 and BS EN 14179-2.
   1.1. Holding period (minimum): Two hours.
2. Certified evidence of treatment: Submit.
3. Designated locations: As indicated on 31 series design drawings.
4. Verification:
   4.1. Submittals: Manufacturer's report.
   4.2. Timing: To comply with detail design and construction programme.

Types of glazing

630 Manifestation

1. Description: To ground floor curtain walling and other glazed elements.
2. Manufacturer: Contractor's choice.
3. Design: As indicated on 31 series design drawings.
4. Technique: Applied film

650 Insulated glass units (IGUs) – performance

1. Description: To aluminium framed window systems as described in 31 series design drawings.
2. Type: Double-pane
3. Standard: To BS EN 1279-5.
4. Performance characteristics to BS EN 1279-5
   4.1. Fire performance
      4.1.1. Fire resistance: As per Fire Engineer's information.
      4.1.2. Reaction to fire: To BS EN 13501-1, Class A2-s1, d0 or better
   4.2. Safety in use
      4.2.1. Bullet resistance: Manufacturer's recommendation.
      4.2.2. Explosion resistance: Manufacturer's recommendation.

4.2.3. Burglar resistance: To satisfy security requirements of glazed unit(s).

4.2.4. Pendulum body impact resistance: To BS EN 12600.

4.2.5. Resistance against sudden temperature changes and temperature differentials: Manufacturer's recommendation.

4.2.6. Resistance against wind, snow, permanent load and/ or imposed loads: Manufacturer's recommendation.

4.3. Direct airborne sound reduction: As per Acoustic Engineer's information.

4.4. Energy

4.4.1. Thermal properties: As per Service Engineer's information.

4.4.2. Light transmittance and reflectance: As per Service Engineer's information.

4.4.3. Solar energy characteristics: As per Service Engineer's information.

5. Unit thickness: Manufacturer's standard.
6. Location of relevant glass panes: Manufacturer's recommendation.
7. Spacer: Black aluminium spacers fitted as per manufacturer's standard.
8. Other requirements:
   - Sound insulation performance as per Acoustics Specialist information.
   - Security ratings TBC.
9. Verification:
   9.1. Submittals: Relevant product data sheets, proof of certifications and test data.
   9.2. Timing: To comply with detail design and construction programme.

895 Verification on completion

1. Requirement: Evidence of compliance with performance requirements.
2. Method: Manufacturer's performance declarations and inspection of installations.
3. Submittals:
   3.1. Format: Drawings, schedules, technical information, calculations and manufacturer's literature.
   3.2. Timing: To comply with detail design and construction programme.

900 Submittals

1. Refer to section A33 for a detailed summary of individual requirements for the below submittals:
   1.1. Fire performance evidence: Provide third-party certification of product conformity with the specified fire performance.
   1.2. Acoustic performance evidence: Provide third-party certification of product conformity with the specified acoustic performance.
   1.3. Control samples:
      1.3.1. Hand samples of all glazing types.
      1.3.2. Samples of each type of seal.
      1.3.3. Obtain acceptance of appearance and quality before proceeding with the manufacture of the remaining quantity.
      1.3.4. Clearly label all submitted samples.
2. Mock-ups: Not required.
3. Benchmarks: Complete storey height bay and obtain acceptance of appearance before proceeding.

950 Testing

1. General: Refer to section A39 for general testing requirements.

2. For the systems proposed, independently certified tests and Agrément certificates must be provided before manufacture, to provide evidence the systems meet the specified performance and quality requirements.
3. Testing will be required where independently certified tests and Agrément certificates cannot be provided as evidence of compliance. These tests must comply with applicable British Standards and UKAS requirements and the following:

Ω End of Section

