ALTERATIONS TO LISKEARD PUBLIC HALL

For

LISKEARD TOWN COUNCIL

Specification

TENDER ISSUE

Planning Approval ref: n/a
Building regulations Approval ref: BC16/02629/COTFPP

Prepared by

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INFORMATIVE

ALL THE WORK IS TO BE OF HIGH QUALITY. THE CONTRACTOR MUST READ ALL OF THIS DOCUMENT AND THE DRAWINGS. ALL THE INFORMATION IS RELEVANT TO THE WORK IN HAND. IF A PARTICULAR PRODUCT IS SPECIFIED THAT IS WHAT IS REQUIRED. ALTERNATIVES USED WILL BE REQUIRED TO BE REMOVED AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR MUST ENSURE THAT ALL WORKPEOPLE AND ANY SUBCONTRACTORS CAN DELIVER QUALITY FIRST TIME. SUCH AN APPROACH WILL ENABLE THE WORK TO PROGRESS TO A SATISFACTORY CONCLUSION WITHOUT UNPLEASANTNESS. THE CONTRACTOR HAS A RESPONSIBILITY TO MANAGE ALL SITE WORK IN TERMS OF BOTH QUALITY AND PROGRESS.

PLEASE NOTE THE DEFINITION OF PRACTICAL COMPLETION AND SNAGGING (A31). SNAGGING WILL BE UNDERTAKEN ONLY ON WHOLLY COMPLETED WORK. IT IS NOT WITHIN THE ARCHITECT'S BRIEF TO PRODUCE A LIST OF ITEMS NEEDING COMPLETION FOR THE CONTRACTOR'S OR SUBCONTRACTOR'S CONVENIENCE.

THERE ARE SPECIFIC RESTRICTIONS AGAINST PRICING SPECIFIED AND SCHEDULED ITEMS PROVISIONALLY.

A10 PROJECT PARTICULARS

110 THE PROJECT:
Name: Alterations to Liskeard Public Hall

120 EMPLOYER (CLIENT):
Liskeard Town Council

127 THE PRINCIPAL CONTRACTOR:
The Contractor

140 ARCHITECT (hereinafter referred to as 'CA'):
Studio Winter Chartered Architect
The Guildhall, Liskeard, Cornwall PL14 3JE
Tel: 01579 345354
Email: mail@studiowinter.com

141 CONTRACT ADMINISTRATOR (hereinafter referred to as 'CA'):
As 140

150 QUANTITY SURVEYOR:
As 140

A11 TENDER AND CONTRACT DOCUMENTS

110 THE TENDER DRAWINGS are: As per issue schedule

120 THE CONTRACT DRAWINGS: to be the same as the tender drawings

160 THE PRE-TENDER HEALTH AND SAFETY INFORMATION to be provided by Principal Designer (Martin Perry Associates, Suite 1 BFM House, The Parade, Liskeard, Cornwall PL14 6AF t: 01579 345777 e: mail@mperryassociates.com), see Section A34.

A12 THE SITE/EXISTING BUILDINGS

110 THE SITE:
The Public Hall, West Street, Liskeard, Cornwall PL14 6BW

140 EXISTING MAINS/SERVICES:
Water, gas, telephone & electricity.

185 HEALTH AND SAFETY FILE:
There is no current Health & Safety file.

210 PARKING & VEHICLE ACCESS:
There are no facilities for on site or off-street parking or skips. There is a public car park further along West Street.

220 USE OF THE SITE:
Do not use the site for any purpose other than carrying out the Works.

230 SPECIFIC RESTRICTIONS:

240 RISKS TO HEALTH AND SAFETY:

- The nature and condition of the site/building cannot be fully and certainly ascertained before it is opened up. However the following risks are or may be present:
- Bird/Vermin guano & nests
- Hidden services
- Known / hidden / unrecorded asbestos containing materials
- Employer's personnel access
- Town Councillor's / Mayor access
- Public access
- Structural works above timber floors to rooms below
- High level works over stairs

See A34

The accuracy and sufficiency of this information is not guaranteed by the Employer or the CA and the Contractor must ascertain for himself any information he may require to ensure the safety of all persons and the Works.

280 SITE VISIT:
Before tendering, ascertain the nature of the site, access thereto and all local conditions and restrictions likely to affect the execution of the Works. Visits may be made by arrangement only giving at least 24hrs notice.

A13 DESCRIPTION OF THE WORK

120 THE WORK:

1. Install platform lift
2. Internal structural & non-structural alterations
3. Alterations to services including changes / upgrade to fire alarm
4. New doc-M wc grab rail packs
5. New suspended ceilings
6. New fire doors
7. Decorations including stripping wallpaper / skimming walls
8. New floor finishes
9. Associated works

140 WORK BY OTHERS CONCURRENT WITH THE CONTRACT is described in section A50 of the tender documents.

150 COMPLETION WORK BY OTHERS:

1. Installation of kitchen
2. Installation of bar counter

A30 TENDERING/SUBLETTING/SUPPLY

MAIN CONTRACT TENDERING

110 SCOPE: These conditions are supplementary to those stated in the invitation to tender and on the Form of Tender.

170 ACCEPTANCE OF TENDER: The Employer and his representatives:

- Offer no guarantee that the lowest or any tender will be recommended for acceptance or accepted.
- Will not be responsible for any cost incurred in the preparation of any tender.

190 PERIOD OF VALIDITY: Tenders must remain open for consideration (unless previously withdrawn) for not less than 6 weeks from the date fixed for the submission or lodgement of tenders. Information on the date for possession/commencement is given in section A20.

PRICING/SUBMISSION OF DOCUMENTS

211 PRELIMINARIES IN THE SPECIFICATION: The Preliminaries/General conditions sections (A10-A55 inclusive) must not be relied on as complying with SMM7.

220 PRICING OF PRELIMINARIES: Preliminary items are noted in the schedules. Include all pricing under the appropriate heading within the schedules.

310 SPECIFICATION WITHOUT QUANTITIES: Where and to the extent that quantities are not included in the specification/schedules, tenders must include for all work shown or described in the tender documents as a whole or clearly apparent as being necessary for the complete and proper execution of the Works.

320 PRICING OF SPECIFICATION: Alterations and qualifications to the specification must not be made without the written consent of the CA. Tenders containing unauthorised alterations or qualifications may be rejected. Costs relating to items in the specification which are not priced will be deemed to have been included elsewhere in the tender.

325 CONTRACTORS PROVISIONAL SUMS: The contractor shall not insert provisional sums in the priced schedules to avoid the need to make an accurate assessment of the cost of any item in the hope that the work will then be undertaken on a daywork basis. The cost of any items not priced accurately will be determined by the Architect irrespective of the contended costs of the Contractor.

330 THE PRICED SPECIFICATION must be submitted within 1 week of request in the format of a completed spreadsheet in paper and digital form.

441 A SCHEDULE OF RATES must be submitted with the tender:
- Craftsman
- Labourer
- Electrician
- Plumber

442 SUPPLY OF PRODUCTS AND MATERIALS: If additional items of materials or products are supplied the contractor shall be allowed a profit percentage of 10% of the discounted invoiced price. The Architect is well aware of the discount rates that prevail, particularly in the plumbing and electrical supply chain.

480 PROGRAMME: The Contractor's proposed programme as specified in Section A32 or a summary thereof showing the sequence and timing of the principal parts of the Works, periods for planning and design and itemising any work which is excluded must be submitted. The main sequence of works must be as follows:

a – as contractor prefers

A31 PROVISION, CONTENT AND USE OF DOCUMENTS

DEFINITIONS AND INTERPRETATIONS

120 CA means the person nominated in the Contract as Architect or Contract Administrator or his authorised representative.

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

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

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

200 PRACTICAL COMPLETION means that ALL work has been completed satisfactorily and drawings of as installed services have been provided.

205 SNAGGING means identifying minor shortcomings in work that is completed fully.

210 EQUIVALENT PRODUCTS: Wherever products are specified by proprietary name that is the product that must be used. If an equivalent product is allowed "or equal" will be used in the description.

220 REFERENCES TO BSI DOCUMENTS are to the versions and amendments listed in the BS1 Standards Catalogue

270 SIZES: Unless otherwise stated:
- Products are specified by their co-ordinating sizes.
- Where cross section dimensions of timber shown on drawings are nominal sizes before any required planning they are described as "ex", for example, ex 150 x 75mm means taken out of a sawn section 150 x 75mm. Dimensions not noted as "ex" mean actual finished size.

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

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

TERMS USED IN REFURBISHMENT / ALTERATION

311 REMOVE means disconnect, dismantle as necessary and remove the stated element, work or component and all associated accessories, fastenings, supports, linings and bedding materials, and dispose of unwanted materials. It does not include removing hidden associated pipework, wiring, ductwork or other services.

321 KEEP FOR REUSE means:
- During removal prevent damage to the stated components or materials, and clean off bedding and jointing materials.
- Stack neatly, adequately protect and store until required by the Employer or for use in the Works as instructed.

331 REPLACE means:
- Remove the stated existing components, features and finishes.
- Provide and fit in lieu new components, features or finishes, which, unless specified otherwise, must match those, which have been removed.
- Make good as necessary.

341 REPAIR means carry out local remedial work to components, features and finishes as found in the existing building. Re-secure or refix as necessary and leave in a sound and neat condition. It does not include:
- Replacement of components or parts of components.
- Redecoration.

351 MAKE GOOD means carry out local remedial work to components, features and finishes which have been disturbed by other, previous work under this Contract and leave in a sound and neat condition. It does not include:
- Replacement of components or parts of components.
- Redecoration.

The meaning of the term shall not be limited by this definition where used in connection with the defects liability provisions of the Contract.

361 EASE means make minor adjustments to moving parts of the stated component to achieve good fit in both open and closed positions and ensure free movement in relation to fixed surrounds. Make good as necessary.

371 TO MATCH EXISTING means use products, materials and methods to match closely all visual characteristics and features of the existing work, with joints between existing and new work as inconspicuous as possible, all to approval of appearance.

DOCUMENTS PROVIDED ON BEHALF OF EMPLOYER

410 ADDITIONAL COPIES OF DRAWINGS: Two copies of drawings (not counting any certified copy of the Contract Drawings) will be issued to the Contractor free of charge. Additional copies will be issued on request but will be charged to the Contractor.

430 ADDITIONAL COPIES OF SPECIFICATION: After execution of the Contract, two copies of the Specification will be issued to the Contractor in accordance with the Contract. Additional copies will be issued on request, if available, but will be charged to the Contractor. The schedules are available as an Excel spreadsheet, the contractor may copy and adapt as necessary.

440 DIMENSIONS: The accuracy of dimensions scaled from the drawings is not guaranteed. Obtain from the CA any dimensions required but not given in figures on the drawings nor calculable from figures on the drawings.

DOCUMENTS PROVIDED BY CONTRACTOR / SUBCONTRACTORS

640 PRODUCTION INFORMATION must be provided by the Contractor/Domestic Subcontractor(s) as follows:
- Catalogue/literature identifying all services equipment such as boilers, controls, TRV's.
- Submit to CA for comment and make any necessary amendments.
- Submit sufficient copies of final version to CA for distribution to all affected parties.

692 AS BUILT DRAWINGS AND INFORMATION must be provided to the CA not less than 2 weeks before the date for Completion as follows:
- Electrical layouts including location of all underground cables.
- New drainage as installed.
- Location of pipework, valves and the like and heating circuit.

700 COMMISSIONING CERTIFICATES: Carry out all testing and commissioning and provide all relevant Commissioning Certificates. The supply of these Certificates is necessary to achieve Practical Completion.

720 MAINTENANCE INSTRUCTIONS AND GUARANTEES: Retain copies delivered with components and equipment (failing which, obtain), register with manufacturer as necessary and hand over to CA on or before Practical Completion.

A32 MANAGEMENT OF THE WORKS

GENERALLY

110 SUPERVISION: Accept responsibility for co-ordination, supervision and administration of the Works, including all subcontracts. Arrange and monitor a programme with each subcontractor, supplier, local authority and statutory undertaker, and obtain and supply information as necessary for co-ordination of the work. Control the work of all workpeople including subcontractors to ensure delivery of quality. As soon as any poor quality work is executed stop the person working and if they are unable to do it right get someone else.

120 INSURANCES: Before starting work on site submit documentary evidence and/or policies and receipts for the insurances required by the Conditions of Contract.

130 INSURANCE CLAIMS: If any event occurs which may give rise to any claim or proceeding in respect of loss or damage to the Works or injury or damage to persons or property arising out of the Works, forthwith give notice in writing to the Employer, the CA and the Insurers. Indemnify the Employer against any loss, which may be caused by failure to give such notice.

140 CLIMATIC CONDITIONS: Keep an accurate record of:
- Daily maximum and minimum air temperatures (including overnight).
- Delays due to adverse weather, including description of the weather, type(s) of work affected and number of hours lost.

150 OWNERSHIP: Materials arising from the alteration work are to become the property of the Contractor except where otherwise stated. Remove from site as work proceeds.

PROGRAMME/PROGRESS

211 PROGRAMME:

- As soon as possible and before starting work on site prepare in an approved form a master programme for the Works, which must make allowance for all:
  - Design and production information provided by the Contractor/Subcontractors/Suppliers, including inspection and checking (see section A31).
  - Planning and mobilisation by the Contractor
  - Work resulting from instructions issued in regard to the expenditure of provisional sums (see section A54)
  - Work by or on behalf of the Employer (see section A50)

  the nature and scope of which, the relationship with preceding and following work and any relevant limitations are suitably defined in the Contract Documents.
- Where and to the extent that the programme implications for work which is not so defined are impossible to assess the Contractor should exclude it from his programme and confirm this when submitting the programme.
- Submit 4 copies to CA.

A programme must be pinned up on site for all to see.

230 SUBMISSION of programmes will not relieve the Contractor of his responsibility to apply in writing for instructions, drawings, etc. in accordance with the Conditions of Contract.

240 COMMENCEMENT OF WORK: Inform the CA at least 7 working days before the proposed date for commencement of work on site.

250 MONITORING: Record progress on a copy of the programme kept on site. If any circumstances arise which may affect the progress of the Works put forward proposals or take other action as appropriate to minimise any delay and to recover any lost time.

260 CA'S SITE MEETINGS:

- The CA will hold regular site meetings to review progress and other matters arising from the administration of the Contract. Formal meetings will normally be held monthly.
- Attend all meetings and inform subcontractors and suppliers when their presence is required.

270 CONTRACTOR'S SITE MEETINGS: Hold meetings with appropriate subcontractors and suppliers shortly before main site meetings to facilitate accurate reporting of progress.

290 NOTICE OF COMPLETION: Give CA at least 2 weeks notice of the anticipated dates of Practical Completion of the whole or parts of the Works.

300 ADVERSE WEATHER: Use all reasonable and suitable building aids and methods to prevent or minimise delays during adverse weather conditions.

310 EXTENSIONS OF TIME: When a notice of the cause of any delay or likely delay in the progress of the Works is given under the Contract, written notice must also be given of all other causes which apply concurrently. The Contractor shall, as soon as possible, submit to the CA:

- Relevant particulars of the expected effects, if appropriate related to the concurrent causes,
- An estimate of the extent, if any, of the expected delay in the completion of the Works beyond the Date for Completion, and

- All other relevant information required by the CA.

320 DISTURBANCE OF REGULAR PROGRESS: Any application under Contract in respect of direct loss and/or expense must be made as soon as practicable and with (or to be followed by) the requisite supporting information so as to afford the CA the opportunity to issue instructions designed (according to the circumstances) to minimise or avoid that loss and/or expense.

CONTROL OF COST

410 CASH FLOW FORECAST: As soon as possible and before starting work on site submit to the CA a forecast showing the gross valuation of the Works at the date of each Interim Certificate throughout the Contract period and based upon the programme for the Works.

432 PROPOSED INSTRUCTIONS: If the CA issues details of a proposed instruction with a request for an estimate of cost, submit such an estimate without delay and in any case within 7 days. The estimate must include:

- A detailed breakdown of the cost including any allowance for direct loss and expense.
- Details of any additional resources, which may be required.
- Details of any adjustments, which may have to be made to the programme for the Works.
- Any other information as is reasonably necessary for the CA to fully assess the implications of issuing such an instruction.

Inform the CA immediately if it is not possible to comply with any of the above requirements.

440 MEASUREMENTS: Give reasonable notice to CA before covering up work which the CA requires to be measured.

450 DAYWORK VOUCHERS: Give reasonable notice to the CA of the commencement of any work for which daywork vouchers are to be submitted. Before being delivered each voucher must be:

- Referenced to the instruction under which the work is authorised, and
- Signed by the person in charge as evidence that the workmen's names, the time spent by each, the plant and materials shown are correct.

460 INTERIM VALUATIONS: At least 5 days before the end of each established period for interim valuations submit to the CA details of amounts due under the Contract together with all necessary supporting information. The CA's decision as to valuation amount will be final.

471 UNFIXED MATERIALS: At the time of each valuation disclose to the CA which of the unfixed materials and goods on site are free from, and which are subject to, any reservation of title inconsistent with passing of property as required by Clauses the Conditions of Contract, together with their respective values. When requested provide evidence of freedom from reservation of title. Any goods that are valued are deemed to be in perfect condition and become the property of the Employer.

A33 QUALITY STANDARDS / CONTROL

MATERIALS AND WORK GENERALLY

110 GOOD PRACTICE: Where and to the extent that materials, products and workmanship are not fully detailed or specified they are to be:

- Of a standard appropriate to the Works and suitable for the functions stated in or reasonably to be inferred from the project documents, and
- In accordance with good building practice.

120 GENERAL QUALITY OF PRODUCTS:

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

130 PROPRIETARY PRODUCTS:

- Handle, store, prepare and use or fix each product in accordance with its manufacturer's current printed or written recommendations/instructions. Inform CA if these conflict with any other specified requirement. Submit copies to CA when requested.
- The tender will be deemed to be based on the products specified and recommendations on their use as described in the manufacturers' literature current at January 2004.
- Obtain confirmation from manufacturers that the products specified and recommendations on their use have not been changed since that time. Where such change has occurred, inform CA and do not place orders for or use the affected products without further instructions.
- Where British Board of Agrément certified products are used, comply with the limitations, recommendations and requirements of the relevant valid certificates.

180 BS 8000: BASIC WORKMANSHIP:

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

190 WATER FOR THE WORKS: Available without charge.

A34 SECURITY / SAFETY / PROTECTION

GENERALLY

114 CONSTRUCTION HAZARDS arising from the design of the project include those identified below. Commonplace hazards which good management should control and good site practices are not listed.

- Hazard: Bird/bat/vermin guano & nests.
  Precautions assumed, check for existence of nests & remove from site out of breeding seasons. Nesting birds are not to be disturbed during breading season.
- Access to site to be prohibited at all times.
- Vehicles & Access: Highway & footpath access.
- Hidden services
- Known / hidden / unrecorded asbestos containing materials
- Employer's personnel access
- Town Councillor's / Mayor access
- Public access
- Structural works above timber floors to rooms below
- High level works over stairs

125 HSE APPROVED CODES OF PRACTICE: Comply with the following:
- Management of health and safety at work.
- Managing construction for health and safety.

130 SECURITY:
- Adequately safeguard the site, the Works, products, materials, plant, and any existing buildings affected by the Works from damage and theft. Take all reasonable precautions to prevent unauthorised access to the site, the Works and adjoining property.

150 OCCUPIED PREMISES:
- The Employer will occupy the adjacent buildings & access to them for pedestrians & vehicles needs to be maintained throughout the works.

PROTECT AGAINST THE FOLLOWING:

221 NOISE:
- Comply generally with BS 5228.
- Fit all compressors, percussion tools and vehicles with effective silencers of a type recommended by manufacturers of the compressors, tools or vehicles.
- Do not use pneumatic drills and other noisy appliances during without consent of the CA.
- Do not use or permit employees to use radios or other audio equipment in ways or at times which may cause nuisance.

230 POLLUTION: Take all reasonable precautions to prevent pollution of the site, the Works and the general environment including streams and waterways. If pollution occurs, inform the appropriate Authorities and the CA without delay and provide them with all relevant information.

240 NUISANCE: Take all necessary precautions to prevent nuisance from smoke, dust, rubbish, vermin and other causes.

260 FIRE: Take all necessary precautions to prevent personal injury, death, and damage to the Works or other property from fire. Comply with Joint Code of Practice 'Fire Prevention on Construction Sites' published by the Building Employers Confederation, the Loss Prevention Council and the National Contractors' Group.

263 FIRE:
- Smoking will not be permitted in any part of building.

270 WATER:
- Prevent damage from storm and surface water. (Items for keeping the site and excavations free of water are given elsewhere).

280 MOISTURE:
- Prevent the work from becoming wet or damp where this may cause damage. Dry out the Works thoroughly. Control the drying out and humidity of the Works and the application of heat to prevent:
- Blistering and failure of adhesion.
- Damage due to trapped moisture.
- Excessive movement.

290 WASTE:
- Remove rubbish, debris, surplus material and spoil regularly and keep the site and Works clean and tidy.
- Remove all rubbish, dirt and residues from voids and cavities in the construction before closing in.
- Ensure that non-hazardous material is disposed of at a tip approved by a Waste Regulation Authority.
- Remove all surplus hazardous materials and their containers regularly for disposal off site in a safe and competent manner as approved by a Waste Regulation Authority and in accordance with relevant regulations.
- Retain waste transfer documentation on site.

PROTECT THE FOLLOWING:

410 WORK IN ALL SECTIONS:
- Adequately protect all types of work and all parts of the Works, including work carried out by others, throughout the Contract. Wherever work is of an especially vulnerable nature or is exposed to abnormal risks provide special protection to ensure that damage does not occur.

420 EXISTING SERVICES:
- Notify all service authorities and/or adjacent owners of the proposed works not less than one week before commencing site operations.
- Before starting work check positions of existing mains/services. Where positions are not shown on drawings obtain relevant details from service authorities or other owners.
- Observe service authority's recommendations for work adjacent to existing services.
- Adequately protect, and prevent damage to all services. Do not interfere with their operation without consent of the service authorities or other owners.
- If any damage to services results from the execution of the Works, notify CA and appropriate service authority without delay. Make arrangements for the work to be made good without delay to the satisfaction of the service authority or other owner as

appropriate. Any measures taken by the CA to deal with an emergency will not affect the extent of the Contractor's liability.

- Replace any marker tapes or protective covers disturbed during site operations to the service authority's recommendations.

430 HIGHWAY/DRIVES AND FOOTPATHS:

- Adequately maintain roads and footpaths within and adjacent to the site and keep clear of mud and debris. Any damage to roads and footpaths caused by site traffic or otherwise consequent upon the Works must be made good to the satisfaction of CA. Bear any costs arising.

450 EXISTING FEATURES:

- Prevent damage to existing buildings, fences, gates, walls, roads, paved areas or lawns and other site features during the execution of the Works.

481 ADJOINING PROPERTY:

- Eliminate nuisance by limiting access of workpeople.

A35 SPECIFIC LIMITATIONS ON METHOD / SEQUENCE / TIMING

110 SCOPE:

- The limitations described in this section are supplementary to limitations described or implicit in information given in other sections or on the drawings.

130 METHOD/SEQUENCE OF WORK:

- Works sequence to be as follows:
  As the contractor prefers

140 ACCESS TO THE SITE: See section A12.

150 USE OF THE SITE: See section A12.

170 USE OR DISPOSAL OF MATERIALS:
Excavated material to be disposed of off-site.

180 START OF WORK:
To be agreed

190 WORKING HOURS:
08.00hrs. - 18.00hrs. Monday - Saturday

A36 FACILITIES / TEMPORARY WORK / SERVICES

110 LOCATIONS: Inform CA of the intended siting of all spoil heaps, temporary works and services.

120 MAINTAIN, alter, adapt and move temporary works and services as necessary. Remove when no longer required and make good.

261 SANITARY ACCOMMODATION: Use the Employer's facilities (agreed locations only).

441 TELEPHONES: Provide as soon as practicable after the Date of Possession a temporary on site telephone installation for use by the Contractor and Subcontractors, and pay all

charges. Make arrangements to ensure that incoming calls are answered reasonably promptly.

500 METER READINGS: The Contractor will take electricity, gas and water readings before works commence, thereafter-reasonable use will be allowed. If misuse occurs a charge will be made to the contractor.

A37 OPERATION/MAINTENANCE OF THE FINISHED BUILDING

113 THE BUILDING FILE is an information source and guide for the Employer providing an understanding of the building and its systems and enabling it to be operated and maintained safely. Provide CA with 2 copies of the information required below not less than one week before Practical Completion.

- A full description of each of the building services systems installed, written to ensure that the Employer fully understands the scope and facilities provided.
- Operating and maintenance instructions for all equipment and systems installed.
- Copies of manufacturers current technical literature and COSHH dated data sheets for all materials, plant and equipment selected by the Contractor.
- General maintenance instructions for all items of Contractor designed or performance specified work.

220 TRAINING: Before Practical Completion explain and demonstrate to the Employer the purpose, function and operation of the installations.

A40 CONTRACTOR'S GENERAL COST ITEMS: MANAGEMENT AND STAFF

110 MANAGEMENT AND STAFF

A41 CONTRACTOR'S GENERAL COST ITEMS: SITE ACCOMMODATION

For details of site accommodation required or made/not made available by the Employer see section A36.

110 SITE ACCOMMODATION

A42 CONTRACTOR'S GENERAL COST ITEMS: SERVICES AND FACILITIES

For details of services and facilities required or not made available by the Employer see section A36.

150 TELEPHONE AND ADMINISTRATION

160 SAFETY, HEALTH AND WELFARE (see A34/170)

170 STORAGE OF MATERIALS (see A33/150)

180 RUBBISH DISPOSAL (see A34/290)

210 PROTECTION OF WORK IN ALL SECTIONS (see A34/410 et seq)

220 SECURITY (see A34/130)

230 MAINTAIN PRIVATE ROADS AND FEATURES (see A34/430)

240 SMALL PLANT AND TOOLS

A43 CONTRACTOR'S GENERAL COST ITEMS: MECHANICAL PLANT

200 GENERAL PLANT

A44 CONTRACTOR'S GENERAL COST ITEMS: TEMPORARY WORKS

For details of temporary works required or made/not made available by the Employer see section A36.

100 TEMPORARY WORKS

A54 PROVISIONAL WORK / ITEMS

See list in construction notes.

GENERAL WORKS SECTIONS

C10 DEMOLISHING STRUCTURES

GENERAL REQUIREMENTS

130 GROUNDWORKS: Grub up existing drain runs for new connections / runs.

SERVICES AFFECTED BY

210 SERVICES REGULATIONS: Any work carried out to or which affects new or existing services must be in accordance with the byelaws or regulations of the relevant statutory authority.

220 LOCATION OF SERVICES: Locate and mark the positions of services affected by the work. Arrange with the appropriate authorities for the location and marking of the positions of mains services. Arrange for utilities companies to effect alterations to supplies where necessary (see prov sums).

230 DISCONNECTION OF SERVICES: Before starting demolition arrange with the appropriate authorities for the disconnection of services and removal of fittings and equipment.

240 DISCONNECTION OF DRAINS: Locate and disconnect all disused drain connections. Seal within the site to approval.

DEMOLITION WORK

310 WORKMANSHIP GENERALLY:
- Demolish structure(s) in accordance with BS 6187 and Health and Safety Executive Guidance Notes GS29/1, 3 and 4.
- Operatives must be appropriately skilled and experienced for the type of work.

340 HEALTH HAZARDS: Take adequate precautions to protect site operatives and the general public from health hazards associated with the works. In particular, removal of asbestos cement products.

391 ADDITIONAL ASBESTOS BASED MATERIALS: Report immediately to the CA any suspected asbestos based materials discovered during demolition work. Avoid disturbing such materials. Agree with the CA methods for safe removal.

410 UNKNOWN HAZARDS: Inform the CA of any unrecorded voids, tanks, chemicals, etc. discovered during demolition work. Agree with the CA, methods for safe removal, filling, etc.

440 COMPLETION: Clear away all debris and leave the site in a tidy condition on completion.

MATERIALS ARISING

511 OWNERSHIP: The following components and materials are to remain the property of the Employer and shall be set aside for future use:
- Sanitaryware

Carefully remove and store on site where directed.

520 HARDCORE: No demolition materials arising are suitable for hardcore. Remove materials from site.

C52 FUNGUS / BEETLE ERADICATION

100 HEALTH AND SAFETY:
- Comply with the Health and Safety Executive Guide, 'Remedial Timber Treatment in Buildings: A guide to good practice and the safe use of wood preservatives', current at the time of tendering.
- Preservatives to be approved and registered by the Health and Safety Executive (HSE) and listed in 'The Pesticides Register' or 'Reference Book 500' current at the time of tendering. Treatment to be with a preservative that is not harmful to bats.

105 TIMING
- Treatment to roof must be carried out as soon as possible before removing sealing to attic.

106 SCOPE
- All timbers where found necessary.

220 WET ROT: Cut out all rotten material until sound timber is reached, having first checked with the CA that this will not adversely affect the building fabric.

320 BRUSH/SPRAY APPLICATION:
- Manufacturer and reference: Contractors choice
- Apply preservative carefully to all surfaces requiring treatment to ensure adequate absorption, using a coarse, low pressure spray.
- Allow each coat to soak in but not to dry before applying further coats.
- Continue applying until the minimum average coverage of the preservative solution recommended by the manufacturer has been achieved.

360 INJECTION OF MASONRY TO PROTECT EMBEDDED TIMBER:
- Manufacturer and reference: contractors choice
- Drill holes into wall at centres and to depths necessary to form an effective barrier of fungicide around timber.
- Inject fungicide using carefully controlled methods and quantities recommended by the manufacturer to achieve effective penetration and distribution within the wall.

390 GUARANTEE: Provide an insurance backed guarantee, administered by an independent insurance protection company, for a period of not less than 20 years from Practical Completion.

D20 EXCAVATING AND FILLING

To be read with Preliminaries/General conditions.

GENERALLY / THE SITE

121 SOILS AND STRATA: Site investigation information is not available. Make all necessary enquiries concerning the nature and location of soils and strata.

142 GROUND WATER LEVEL on the site is not known.

150 EXISTING SERVICES: Locate existing services prior to excavating. Protect as necessary.

230 BENCHING: Surfaces of excavations with a gradient greater than 1 in 5 which are to receive filling must have horizontal benches cut to match the depths of compacted layers of filling.

240 ADJACENT EXCAVATIONS: Where an excavation encroaches below a line drawn at an angle of 45' from the horizontal from the nearest formation level of another higher excavation, the lower excavation, all work within it and backfilling thereto must be completed before the higher excavation is made.

250 ACCURACY: Permissible deviations from formation levels:
Beneath mass concrete foundations: +/- 25 mm
Beneath ground bearing slabs and r.c. foundations: +/- 15 mm
Embankments and cuttings: +/- 50 mm
Ground abutting external walls: +/- 50 mm, but such as to ensure that finished level is not less than 150 mm below dpc.

CLEARANCE / EXCAVATING

260 FORMATIONS GENERALLY:
- Make advance arrangements with CA for inspection of formations for the following:
  New walls, bases and drains
- Remove the last 150 mm of excavations just before inspection. Trim excavations to required profiles and levels, and remove all loose material.
- Unless otherwise instructed seal formations within 4 hours of inspection with concrete or other specified fill.

270 FOUNDATIONS GENERALLY: Obtain instructions if:
- A natural bearing formation of undisturbed subsoil is not obtained at a reasonable depth.
- The formation contains soft or hard spots or highly variable material.
-

310 UNSTABLE GROUND: Inform CA without delay if any newly excavated face will not remain unsupported sufficiently long to allow the necessary earthwork support to be inserted. If the instability is likely to affect adjacent structures or roadways, take appropriate emergency action until instructions are obtained.

360 EXCESS WIDTH: Backfill any excavations taken:
Wider than required with the material specified for backfilling.
Deeper than required with well graded granular material or lean mix concrete.

DISPOSAL OF MATERIALS

443 SURPLUS SUBSOIL: Remove from site.

450 WATER: Keep all excavations free from water until formations are covered and below ground constructions are completed.

457 PUMPING:

- Do not disturb excavated faces or the stability of adjacent ground or structures.
- Construct sumps clear of the excavations and fill as specified on completion.
-

462 PERMANENT DRAINAGE SYSTEM may be used for disposal of water from the excavations providing the water has, before entering the drainage system, been standing in sedimentation ponds until clear. Obtain consent where necessary from the Employer before discharging water. Make good any damage or disturbance caused to drainage systems by discharging water.

FILLING

510 HAZARDOUS, AGGRESSIVE OR UNSTABLE MATERIALS:

Do not import or use fill materials which would, either in themselves or in combination with other materials or ground water, give rise to a health hazard, damage to building structures or instability in the filling.

Soluble sulphate content (SO3) of materials for filling under concrete slabs or within 1 m of substructures must not exceed 1g/litre when tested to BS 1377:Part 3, clause 5 using a 2:1 water-soil extract. Submit test reports from a UKAS/NAMAS accredited laboratory demonstrating compliance of the proposed material(s).

530 PLACING FILL GENERALLY:

Ensure that excavations and areas to be filled are free from loose soil, rubbish and standing water.
Do not use frozen materials or materials containing ice. Do not place fill on frozen surfaces.
Take all necessary precautions to avoid overloading of adjacent structures and to ensure stability.
Place and compact fill against structures, membranes or buried services in a sequence and manner that will ensure stability and avoid damage.
Plant employed for transporting, laying and compacting must be suited to the type of material.
Lay differing materials separately so that only one type of material occurs in each layer.

540 BENCHING IN FILL: Where, during the progress of the work, the difference in level between adjacent areas of filling exceeds 600 mm, cut into edge of higher filling to form benches having, a minimum width of 600 mm and a height equivalent to the depth of a layer of compacted filling. Spread and compact new filling to ensure maximum continuity with the previous filling.

550 PROTECTION OF COMPACTED FILLING:

Do not allow construction traffic on compacted cohesive soil filling until the level has been raised not less than 150 mm above formation level by properly compacted temporary protective filling.
Remove temporary protective filling from site before beginning permanent construction.

700 BACKFILLING TO FOUNDATIONS:

Under oversite concrete and paving: Hardcore as clause 710.
Under grassed or landscaped areas: Material excavated from the trench, laid and compacted in layers not exceeding 300 mm thick.

710 HARDCORE:

- Granular material, free from harmful matter and excessive dust, well graded, passing a 75mm BS sieve and in any one layer only one of the following:

- Crushed hard rock or quarry waste (other than chalk) with not more binding material than is required to help hold the stone together. NO CRUSHED BUILDING RUBBLE!
- Spread and level both backfilling and general filling in layers not exceeding 150 mm. Thoroughly compact each layer with vibrating plate compactor or other suitable means.

720 HARDCORE UNDER CONCRETE SLABS to be as clause 710 and not less than 100 mm thick. Excavate extra material as necessary. Increase thickness of hardcore as necessary to make up levels from stripped site levels to underside of slabs.

–

730 BLINDING:
Surfaces to receive sheet overlays or concrete to have sufficient sand, fine gravel, PFA or other approved fine material applied to fill interstices and provide a close smooth surface.
Permissible deviations on surface level: +0 -25 mm.
Provide a declaration of analysis including information detailing each of the relevant parameters given in BS 3882, clause 6 and table 2 for the grade of topsoil specified.
Provide a declaration of analysis including information detailing each of the relevant parameters given in BS 3882, clause 6 and table 2 for the grade of topsoil specified.

E05 IN SITU CONCRETE CONSTRUCTION GENERALLY

To be read with Preliminaries/General conditions.

110 ARRANGEMENT OF INFORMATION: The different parts of in situ concrete construction are specified in separate sections as follows:
E10 In situ concrete mixes, casting and curing
E20 Formwork
E30 Reinforcement
E40 Designed joints
E41 Worked finishes/Cutting
E60 Precast/Composite concrete floors/roof decks
Clauses dealing with particular aspects of certain types of construction may thus be dispersed over several sections.

300 LEVELS OF STRUCTURAL CONCRETE FLOORS: As Preliminaries clause A33/370.

310 SURFACE REGULARITY OF CONCRETE STRUCTURAL FLOORS: Sudden irregularities not permitted. When measured with a slip gauge to BS 8204:Part 1 or 2, Figure 3 or equivalent, the variation in gap under a straightedge (with feet) placed anywhere on the surface to be not more than the following:
Floors which are to be self-finished, and floors to receive sheet or tile finishes directly bedded in adhesive:
3 mm under a 3 m straightedge
2 mm under a 1 m straightedge
Floors to receive screeds/toppings/beds up to 50 mm thick:
10 mm under a 3 m straightedge.
Floors to receive mastic asphalt flooring or underlay laid over mastic asphalt levelling coat(s): 10 mm under a 3m straightedge.
Floors to receive mastic asphalt flooring or underlay laid direct: To the same surface regularities as

defined in clause M11/760.

510 EXPOSED CONCRETE CONSTRUCTION: The following clauses in other sections relate specifically to exposed concrete:
Concrete mix: E10/[___]
Curing periods: E10/
Protection: E10/840
Formwork ties: [___]
Plain smooth finish: E20/620
Fine smooth finish: E20/630
Rough board finish: E20/640
Ribbed finish: E20/650
Proprietary form lining finish: E20/660
Finish for abrasive blasting: E20/700
Finish for tooling: E20/710
Cover spacers: E30/491
Rust staining: E30/510
Checking cover: E30/520
Construction joints: E40/[___]
Sealant E40/[___]
Abrasive blasted finish: E41/420
Tooled finish: E41/430.

E10 IN SITU CONCRETE MIXES, CASTING AND CURING

CONCRETE MIXES

100 MIX FOR FLOOR SLAB
- Mix 30N to BS 5328.
- Nominal maximum size of aggregate: 19 mm.
- Admixtures: An accelerator or retarder may not be used.

101 MIX FOR GENERAL STRUCTURAL ITEMS
- Mix 35N to BS 5328.
- Nominal maximum size of aggregate: 19 mm.
- Admixtures: An accelerator or retarder may not be used.

102 DESIGNATED MIX FOR EXTERNAL WORKS (Bases, pads etc)
- Mix 25N to BS 5328.
- Nominal maximum size of aggregate: 19 mm.
- Admixtures: An accelerator or retarder may not be used.

125 SITE MIXED:
-Where appropriate and where quantities are small concrete may be produced by mixer using all-in ballast as follows keeping water content to a minimum:
-Minor structural work such as placing reinforcement in stone walls: 2:9
-General concrete work, slabs, bases and the like: 1:6

130 NORMAL DESIGNED MIX FOR Reinforced concrete
To the relevant clauses of BS 5328:Parts 2, 3 and 4.
Grade RC40
Nominal maximum size of aggregate: 20 mm
Aggregate(s):

Coarse: To BS 882.
Sand: To BS 882.

Cement:

PC, PBFC, HSBC, PPFAC.
Combinations to BS 5328 of PC with ggbs or pfa.

Minimum cement content: 350 kg/cu m
Maximum free-water/cement ratio: 0.55
Maximum cement content: 350kg/cu m
Admixture(s): Plasticisers to CA's approval
Maximum total percentage of chloride ion by mass of cement: 0.4%
Rate of sampling for compressive strength testing: one sample per 50 cu m or each batches whichever represents the lesser volume, but not less than one for each day of use.
Information to be provided by the producer: As BS 5328:Part 3, clause 3.

180 MIXES FOR SUNDRY TYPES OF IN SITU WORK are specified in other sections of this specification as follows:

R12 Drainage below ground

Mixes specified in this section which are equivalent to or better than the above may be used in lieu, subject to approval.

MATERIALS, BATCHING AND MIXING

215 READY-MIXED CONCRETE must be used for all RC works and must be obtained from a plant which holds current certification meeting the requirements of the NACCB, Category 2 for product conformity. Each mix must be obtained from only one source unless otherwise approved. Confirm name and address of depot(s) to CA before any concrete is delivered. Retain all delivery notes for inspection.

255 CEMENTS:

The following abbreviations apply:

PC42.5	Portland cement, Class 42.5 (in lieu of OPC)
PC52.5	Portland cement, Class 52.5 (in lieu of RHPC)
SRPC	Sulphate resisting Portland cement
PBFC	Portland blastfurnace cement
HSBC	High slag blastfurnace cement (in lieu of LHPBC)
PPFAC	Portland pulverised-fuel ash cement
ggbs	Ground granulated blastfurnace slag
pfa	Pulverized fuel ash

Cements, ggbs and pfa must comply with the relevant British Standards. Portland cements must have cement certification meeting the requirements of the NACCB, Category 2 for product conformity.

305 NATURAL AGGREGATES FOR DESIGNED/PRESCRIBED MIXES: To give a drying shrinkage of concrete not exceeding 0.075% when tested to BS 812:Part 120.

315 AGGREGATES FOR EXPOSED WORK: To BS 882, of consistent colour, free from absorbent particles which may cause 'popouts', and other particles such as coal and iron sulphide which may be unsightly or cause unacceptable staining. Obtain from one source, and ensure that adequate supplies can be maintained throughout the contract. Provide samples of proposed aggregates on request.

325 EXPOSED CONCRETE: Obtain approval before altering constituent materials or proportions of concrete which will be exposed in the finished work.

355 **RISK OF ALKALI SILICA REACTION IN DESIGNED/PRESCRIBED MIXES**: Take one of the precautions specified for Designated mixes in clause 5.5.7 of BS 5328:Part 2. Inform CA if this necessitates a change in specification. Submit evidence of compliance to CA before making concrete for use in the Works.

415 **ADMIXTURES FOR DESIGNED/PRESCRIBED MIXES**:
To BS 5075.
Use only if specified or approved, and then in accordance with their manufacturer's recommendations.
Do not use admixtures containing calcium chloride.
Ensure that admixtures are compatible with all other materials, including other admixtures.

460 **ENRICHMENT OF MIX**: Subject to approval, the aggregate: cement ratio may be reduced by up to 10% for the first layer of concrete in walls and columns.

490 **PROPERTIES OF FRESH CONCRETE** to be determined by the Contractor in consultation with the concrete supplier to suit the one site circumstances and methods, but in all respects maintaining compliance with this Specification.

TESTING/CERTIFICATION

510 **COMPLETE CORRELATED RECORDS** must be maintained for each Designed and Prescribed mix including:
Information in accordance with BS 5328:Part 3, clauses 3.1 and 3.2.
All sampling, site tests and identification numbers of all specimens tested in the laboratory.
The location of the part(s) of the structure represented by each sample.
The location in the structure of the batch from which each sample is taken.

520 **TEST LABORATORY**: All specified testing of concrete cubes to be carried out by one NAMAS Accredited laboratory. Submit the name of the selected laboratory to CA as soon as possible and in any case before making trial mixes or concrete for use in the works.

530 **TEST REPORTS**: 1 copy of report to be despatched to CA within one day of completion of each test.
Keep a complete set of reports on site.

550 **BROKEN CUBES**: Keep separately the pieces of each cube which fails to meet the compliance requirements for individual results. Obtain agreement of CA before discarding.

570 **EARLY AGE STRENGTH TESTING**: A regime of accelerated or normal curing and early testing which is capable of predicting the 28 day strength of Designed mixes may be used for determining compliance, subject to prior approval. If such a regime is adopted, two additional cubes must be made from each sample and cured normally so that, in the event of noncompliance, they can be tested at 28 days to provide information which will help in deciding the action to be taken..

580 **FAILURES**:
If a concrete sample fails to achieve specified criteria or to pass specified tests, inform the CA without delay and submit:
- Confirmation of the validity of the test results, and/or
- Proposals for further tests to assess the strength of the concrete in the structure, as set out in BS 6089, and/or
- Proposals for rectification.

Obtain approval of all such evidence and proposals before proceeding. The CA may issue

instructions for the work to be stopped or delayed until reasons for the failure have been established, possible consequences assessed, and appropriate preventative and remedial measures taken.

581 **FAILURES**: Wherever the specified sampling, testing and compliance procedures show that a concrete mix is not in accordance with the specification (even if the work is eventually accepted), and measures are taken to help in establishing whether or not the work is acceptable, such measures:
will be at the expense of the Contractor, and
will not be considered as grounds for extension of time.

PLACING AND COMPACTING

630 **UNDERLAY**: Before placing structural concrete (not blinding concrete) on hardcore or other absorbent substrates, or before laying water tight concrete on blinding ,lay polyethylene sheet, minimum 250 micrometres thick. Lap edges 150 mm.

CONSTRUCTION JOINTS:
Submit details of proposed locations and obtain approval before proceeding.
Carefully brush and spray surface while concrete is still green to remove surface laitance and expose aggregate finish. Obtain approval for any alternative method.
Surface to be clean and damp when fresh concrete is placed against it.

650 **CLEANING**: At time of placing ensure that all surfaces on which concrete is to be placed are clean, with no debris, tying wire clippings, fastenings or free water.

660 **INSPECTION**: Inform CA before each pour of concrete to allow inspection of reinforcement and surfaces against which concrete is to be placed. Agree with CA the period of notice to be given.

670 **TRANSPORTING**:
Avoid contamination, segregation, loss of ingredients, excessive evaporation and loss of workability. Cover concrete during heavy rain.
Clean equipment immediately after use and whenever cement or aggregate is changed.
Use suitable walkways and barrow runs for traffic over reinforcement and freshly placed concrete.

680 **PLACING**:
Record time, date and location of all pours.
Place as soon as practicable after mixing and while sufficiently plastic for full compaction. After discharge from the mixer do not add water or retemper mixes.
Ensure that temperature of concrete is not more than 30 deg C in hot weather and not less than 5 deg C in cold weather. Do not place against frozen or frost covered surfaces.
Place in final position in one continuous operation up to construction joints. Avoid formation of cold joints.
Do not discharge from an excessive height or through reinforcement or other obstructions in a way which may cause uneven dispersal, segregation or loss of ingredients or adversely affect the formwork or formed finishes. Use suitable chutes or trunking where necessary.
Place in layers no thicker than can be effectively compacted with the equipment being used, without delay between layers. Merge together by compaction.
Do not use vibrators to make concrete flow horizontally into position, except where necessary to achieve full compaction under void formers and cast in accessories and at vertical joints.

690 **COMPACTING**: Fully compact concrete to full depth (until air bubbles cease to appear on the top surface), especially around reinforcement, cast-in accessories, into corners of

formwork and at joints. Ensure amalgamation with previous batches, but do not damage adjacent partly hardened concrete. Use appropriate type(s) of mechanical vibration for all concrete.

720 **VIBRATORS**: Inform CA of the number and type of vibrators to be used. Provide standby vibrators. Do not use external vibrators without approval.

730 **PLASTIC SETTLEMENT**: At the top of deep sections and at significant changes in the depth of concrete sections, closely and continuously inspect the fresh concrete for signs of settlement during the first few hours after placing. While the concrete is still capable of being fluidized by the vibrator, revibrate as necessary to remove settlement cracking which may be forming either on the top surface or against the upper part of the vertical formwork.

CURING AND PROTECTION

810 **CURING**:

Prevent surface evaporation from concrete throughout the period(s) specified below by:

- Retaining formwork in position and, if necessary, covering surfaces immediately after striking, and
- Covering top surfaces immediately after placing and compacting each bay, removing covering only to permit any finishing operations and replacing immediately thereafter.

Maintain surface temperature above 5 degC throughout the periods specified below or four days, whichever is the longer

Maintain detailed records of location and timing of casting of individual batches, removal of formwork and removal of coverings. Keep on site, available for inspection.

811 **CURING**:

Coverings for curing may be suitable impervious sheet materials or a suitable curing compound containing a fugitive dye and with an efficiency of at least 75% (90% for surfaces exposed to abrasion). They:

- Must be effective in preventing evaporation, particular attention being paid to sealing at edges and junctions.
- Must not disfigure permanently exposed surfaces.
- Must not affect the satisfactory bond of subsequent construction and finishes.

Curing compounds applied to surfaces which will be exposed in the finished work or which are to receive bonded finishes must be removed by light, even grit blasting.

Until the exposed top faces of fresh concrete are in a state suitable to receive sheets in direct contact or a sprayed curing compound as applicable, cover with waterproof sheeting held clear of the surface and well sealed against draughts at edges and junctions.

820 **CURING PERIODS**, in days (t = the average number of degrees centigrade air temperature during the curing period):

Concrete surfaces which in the finished building will be exposed to the elements; concrete wearing surface floors and pavements; watertight concrete:

	Concrete made using PC42.5, PC 52.5 SRPC	Concrete made using PPFAC, PBFC, HSBC, pfa, ggbs
Drying winds or dry, sunny weather	$\frac{140}{t+10}$	$\frac{180}{t+10}$
Intermediate conditions	$\frac{100}{t+10}$	$\frac{140}{t+10}$

Damp weather, protected from sun and wind	100 t+10	100 t+10

Other structural concrete surfaces (cements as above):

Drying winds or dry, sunny weather	80 t+10	140 t+10
Intermediate conditions	60 t+10	80 t+10
Damp weather, protected from sun and wind	No special requirements	No special requirements

Obtain prior approval for curing periods for mixes using admixtures or other types of cement.

821 CURING PERIODS, in days:
Concrete surfaces which in the finished building will be exposed to the elements; concrete wearing surface floors and pavements; watertight concrete:

	Concrete made using PC 42.5, PC52.5, SRPC,	Concrete made using PPFAC, PBFC HSBC, pfa, ggbs
November to April	10	12
May to October	7	10

Other structural concrete surfaces: No special requirements if in damp weather and protected from sun and wind, otherwise as follows (cements as above):

November to April	6	10
May to October	4	7

Obtain prior approval for curing periods for mixes using admixtures or other types of cement.

822 CURING PERIODS, not less than:

Surfaces which in the finished building will be exposed to the elements, and wearing surfaces of floors and pavements, regardless of weather conditions	10 days
Other structural concrete surfaces	5 days

840 PROTECTION: Prevent damage to concrete, including:
Surfaces generally: From rain, indentation and other physical damage.
Surfaces to be exposed in the finished work: From dirt, staining, rust marks and other disfiguration.
Immature concrete: From thermal shock, physical shock, overloading, movement and vibration.

In cold weather: From entrapment of water in pockets, etc. and freezing expansion thereof.

E20 FORMWORK FOR IN SITU CONCRETE

To be read with Preliminaries/General conditions.

GENERALLY/PREPARATION

110 LOADINGS: Design and construct formwork to withstand the worst combination of:
Total weight of formwork, reinforcement and concrete.
Construction loads including dynamic effects of placing, compacting and construction traffic.
Wind and snow loads.

130 PROPPING: Provide adequate propping to prevent deflection and damage to the structure. Carry down such props to bearings strong enough to provide adequate support.

150 BEARINGS:
Prop through other decks if construction load on a particular deck exceeds the design loading, or where less than 28 days have elapsed from casting, a reduced loading agreed with CA.
Submit details of proposed prop bearings and through propping to CA. Accept responsibility for cost of checking effects on structure.

170 WORK BELOW GROUND:
Vertical faces of strip footings, bases and slabs may be cast against faces of excavation, provided:
Prior approval is obtained.
The faces are sufficiently accurate and stable.
Supports to faces are withdrawn progressively as concrete is placed.
Adequate measures are taken to prevent contamination of concrete.
Faces of walls must be cast against formwork.

181 COMPRESSIBLE BOARD SUBSTRUCTURE FORMWORK:
Low density expanded polystyrene compressible fill.
Where used for foundations, ground beams, etc. lay boards on a flat and even bed. If necessary, blind the bottom of the trench with granular fill or concrete.
Vertical faces of trenches: Ensure that the boards are fully supported for the total depth and restrain the top edge of boards to prevent uplift during concreting. Fix small pieces securely.
Piled construction: Cut boards neatly round concrete piles.
Protect boards from indentation by chairs and spacers using methods recommended by the board manufacturer.

STEELWORK: Remove all loose millscale and loose rust before encasing in concrete.

CONSTRUCTION

310 ACCURACY: Construct formwork accurately and robustly with adequate supports to produce finished concrete to the required dimensions. Formed surfaces must be free from twist and bow (other than any required cambers), all intersections, lines and angles being square, plumb and true.

320 JOINTS IN FORMS: Construct formwork, including joints in form linings and between forms and completed work, to prevent loss of grout, using seals when necessary. Secure formwork tight against adjacent concrete to prevent formation of steps.

330 INSERTS, HOLES AND CHASES:
Confirm positions and details to ensure that alterations to and decisions about their size and location are not made without the knowledge and approval of the CA.
Fix inserts or box out as required in correct positions before placing concrete. Form all holes and chases; do not cut hardened concrete without approval.

350 FORM TIES: No metal part of any device for securing forms is to remain within the specified concrete cover.

470 RELEASE AGENTS: Type(s) which are suitable for use with the type(s) of formwork, formed finishes and specified applied finishes. Use the same type and make throughout the entire area of any one finish. Apply evenly to form faces, from top downwards, and to horizontal surfaces last. Use the minimum amount necessary to obtain a clean release and prevent excessive local collection. Prevent release agent touching the reinforcement, hardened concrete, other materials not part of the form face, and permanent forms.

480 SURFACE RETARDERS: Do not use without approval. Prevent retarder from touching the reinforcement.

STRIKING

510 RESPONSIBILITY: Strike formwork without disturbing, damaging or overloading structure, and without disturbing props. Notwithstanding other clauses in this specification and any checking or approvals by the CA, the responsibility for safe removal of any part of the formwork and any supports without damaging the structure rests with the Contractor.

520 MINIMUM PERIODS:
The following periods (in days) for retaining formwork in position before striking apply to class 42.5 or sulfate-resisting Portland cement concrete with no cement replacement materials or admixtures:

Type of formwork	Average mean of daily minimum and maximum air temperatures during the period		
	16 degC	7 degC	3 degC
Vertical formwork to columns, walls and beams	0.5	0.75	1
Soffit forms to slabs	4	6	8
Props to slabs and soffit forms to beams	10	15	20
Props to beams	14	21	28

Submit details of proposed periods for mixes using admixtures or other types of cement.

521 MINIMUM PERIODS: Alternative methods of determining minimum periods for retaining formwork in position may be submitted for approval. Accept responsibility for cost of checking of proposals by CA and for any testing.

FORMED FINISHES

610 BASIC FINISH: no particular requirements, except those for tolerances and full compaction.

620 PLAIN SMOOTH FINISH:
Produce an even finish with a sheet material (e.g. plywood), with panels arranged in a regular pattern as a feature of the surface.
Abrupt irregularities to be not greater than 5 mm. Gradual irregularities, expressed as maximum permissible deviation from a 1 m straight edge, to be not greater than 5 mm.
Variation in colour resulting from the use of an impermeable form lining will be permitted but the surface to be free from discolouration due to contamination or grout leakage.
Blowholes less than 10 mm in diameter will be permitted but otherwise surface to be free from voids, honeycombing, segregation and other large defects.
Making good: Projecting fins are to be removed and rubbed down with a carborundum stone but otherwise the finish is to be left as struck. Making good of small defects will normally be permitted after inspection by CA.
Formwork tie holes to be in an approved regular pattern, filled with matching mortar to an approved sample.
Complete a sample area of the finished work, size sq m, in advance of the remainder, in an approved location, and obtain approval of appearance before proceeding.

E30 REINFORCEMENT FOR IN SITU CONCRETE

To be read with Preliminaries/General conditions.

REINFORCEMENT

110 QUALITY ASSURANCE: All steel reinforcement specified to comply with BS 4449 or BS 4483 and cut and bent to BS 4466, is to be obtained from firm(s) holding a valid certificate of approval, issued under a product certificate scheme operated by a third party certification body with appropriate Category 2 accreditation from the United Kingdom Accreditation Service (UKAS).

140 PLAIN BAR REINFORCEMENT: To BS 4449, Grade 250.

150 DEFORMED BAR REINFORCEMENT: To BS 4449, Grade 460.

165 GALVANIZED REINFORCEMENT: Type(s) as specified, galvanized to BS 729 after cutting but before bending

170 STAINLESS STEEL BAR REINFORCEMENT: To BS 6744,

180 EPOXY COATED BAR REINFORCEMENT: To BS 7295:Part 1,

210 FABRIC REINFORCEMENT: To BS 4483.

240 PREFABRICATED SHEAR REINFORCEMENT SYSTEM
Use shearhoops of the type(s) and size(s) shown on the drawings to provide shear reinforcement at the locations indicated.
Install strictly in accordance with manufacturer's recommendations.

WORKMANSHIP

310 **CUT AND BEND** reinforcement to schedules and to BS 4466. Do not bend when below 5 degrees without approval. Steel may be warmed to not more than 100 degrees. Do not rebend bars without approval. Tag bundles of reinforcement with labels to BS 4466

311 **CUT AND BEND** stainless steel bars to BS 4466 as for high yield bars.

317 **MECHANICAL DAMAGE**: Reinforcement must not be roughly handled, dropped from a height, or subjected to shock loading or mechanical damage.

325 **CLEANLINESS**: At time of placing concrete, reinforcement to be clean and free of corrosive pitting, loose millscale, loose rust, ice, oil and other substances which may adversely affect the reinforcement, concrete, or bond between the two.

330 **ADJUSTMENTS**: Provide on site facilities for hand bending to deal with approved minor adjustments.

360 **PROJECTING REINFORCEMENT**: Grade 250 bars may be bent to radii not less than BS 4466, Table 3. Grade 460 bars must not be bent or straightened without approval

410 **LAPS OR SPLICES**: Obtain instructions if details are not shown on drawings.

420 **LAPS** in nominal bar reinforcement to be not less than 300 mm.

421 **LAPS** in fabric reinforcement, where not detailed, to be not less than 250 mm. Where necessary seek instructions to avoid a four layer build-up at corners.

434 **STRUCTURAL WELDED JOINTS** will not be permitted.

MECHANICAL JOINTS may be substituted for lapped joints subject to approval. Submit full details, including joint type(s) and location(s). Accept responsibility for cost of checking by the CA and for any supervision and testing.

451 **FIXING GENERALLY**:
Unless otherwise permitted fix reinforcement in position before placing concrete. In addition to any spacers and chairs shown on drawings or schedules, provide adequate support, tie securely and maintain the specified cover. Comply generally with Concrete Society Report CS 101 'Spacers for reinforced concrete' 1989.
Unless otherwise specified tie using 16 swg annealed tying wire. Ensure that tying wire does not intrude into the concrete cover. Do not tack weld unless authorised by the CA and recommended by the reinforcement manufacturer.
Do not fix or place reinforcement in contact with nonferrous metals.

455 **FIX STAINLESS STEEL REINFORCEMENT** as clause 451 using 16 swg annealed stainless steel wire.

465 **FIX EPOXY COATED REINFORCEMENT** as clause 451 and BS 7295:Part 1, Appendix E.

470 **COVER**:
Not less than the nominal cover minus 5 mm.
Where reinforcement is located in a particular direction in relation to only one face of a member, not more than the nominal cover plus:

5 mm on bars up to and including 12 mm size.
10 mm on bars over 12 mm up to and including 25 mm size.
15 mm on bars over 25 mm size.

Before concreting check thoroughly that the specified cover dimensions have been obtained.

481 **GROUND BEARING SLABS**: Where these are reinforced with a single layer of fabric in the upper part of the slab, the fabric may be placed in position on top of the first compacted layer of concrete, followed by the top layer of concrete, placed within two hours of the first layer.

491 **SPACERS** to formed concrete finishes, if permitted (see section E20) to be approved type(s).

500 **DAMAGE**: Prevent damage to and disfigurement of forms, form linings and adjacent work.

510 **RUST STAINING**: Prevent rust staining of surfaces of concrete which will be exposed to view in the finished work, caused by, e.g. rust stained formwork or unprotected projecting reinforcement.

520 **CHECKING COVER**: Check the position of the reinforcement in the hardened concrete as soon as practicable after casting using a magnetic induction digital display type cover meter in accordance with manufacturer's recommendations and BS 1881:Part 204. Pay particular attention to columns, beams, cantilevers, soffits of slabs and all faces which will be exposed to the weather in the finished building. Inform CA when such checking is to be carried out, confirm that it has been carried out and that the results were satisfactory.

E40 DESIGNED JOINTS FOR IN SITU CONCRETE

To be read with Preliminaries/General conditions.

110 **ACCURACY**: All joints to be accurately located, straight and well-aligned, and truly vertical or horizontal or parallel with the setting out lines of the building.

120 **CONSTRUCTION/MOVEMENT JOINTS:**

Form joints accurately to detail and in locations shown on the drawings.
If modifications to any joint design or location are necessary on site, agree revisions with CA before proceeding.
Do not allow concrete to enter any gaps or voids in the formwork or to render the movement joints ineffective.
Do not allow concrete to impregnate or penetrate any materials used as compressible joint fillers.
Do not place concrete simultaneously on both sides of movement joints.

150 **CONSTRUCTION JOINTS IN CONCRETE WEARING SURFACE FLOORS**, additional to joints required by the designer, will not be permitted.

210 **FORMED JOINTS**: Construct using rigid, grout-tight side forms or stop ends designed to accommodate projecting bars or fabric without temporary bending or displacement.

211 **FORMED JOINTS** in concrete wearing surface floors:

Forms to be square edged with a steel top surface and in good condition.
Compact thoroughly at edges to give level, closely abutted joints with no lipping.

230 **ROUGHENING OF CONSTRUCTION JOINT FACES**: Brush and spray surface of construction joints while concrete is still green to leave a thoroughly roughened exposed

aggregate finish.

410 TIE BARS:
To BS 4449, Grade 250, clean and free from loose millscale, loose rust, ice, oil and other deleterious substances.
Fix securely at the stated centres, at the required depth, and centred on the joints.

420 MESH TIE STRIPS:
To BS 4483, clean and free from loose millscale, loose rust, ice, oil and other deleterious substances.
Fix securely at the required depth with the width of the mesh strip centred on the joint.

430 DOWEL BARS:
To BS 4449, Grade 250, perfectly straight, with sawn (not sheared) ends.
Coat half of each bar with a suitable proprietary debonding compound or fit with a suitable plastics sleeve.
Fix bars securely at the required depth, perfectly level, at right angles to and centred on the joint.
At expansion joints fit an approved type of cap incorporating not less than 20 mm of compressible material to debonded ends of all bars.

SHEET JOINT FILLER FOR EXPANSION JOINTS:
Natural bonded cork.

SEALANT FOR FLOOR MOVEMENT JOINTS:
Prepare joints and apply sealant as section Z22

E41 WORKED FINISHES TO IN SITU CONCRETE

To be read with Preliminaries/General conditions.

150 TIMING: Carry out all finishing operations at optimum times in relation to the setting and hardening of the concrete. Do not wet surfaces of concrete to assist surface working. Do not sprinkle cement on to surface.

TAMPED FINISH: Tamp surface with edge of a board or beam to give an even texture of parallel ribs.

245 FINISH SUITABLE TO RECEIVE A SAND/CEMENT SCREED: When a screed is to be laid on set and hardened concrete the surface must be clean, firm and rough to ensure a good bond. If necessary hack it thoroughly to provide good key, then brush it well and wash it down to remove dust and dirt. Refer also to Architect's requirements.

310 SMOOTH FLOATED FINISH
Use a hand float, skip float or power float to give an even surface with no ridges or steps.

320 TROWELLED FINISH
Float concrete to an even surface with no ridges or steps, then immediately commence curing as specified in section E10.
When the concrete is suitably stiff, hand or power trowel to give a uniform smooth but not polished surface, free from trowel marks and other blemishes, and suitable to receive the specified flooring material.
Resume specified curing without delay.
Protect the surface from construction traffic until flooring material is laid.

If, because of inadequate finishing or protection, the surface of the concrete is not suitable to receive the specified flooring material, it must be made good by application of a smoothing compound by and to the satisfaction of the flooring subcontractor. Allow for the cost of any such making good.

330 TROWELLED FINISH for wearing surfaces:
Float concrete to an even surface with no ridges or steps, then immediately commence curing as specified in section E10.
Successively hand or power trowel at intervals, applying sufficient pressure to close the surface, to give a uniform smooth finish free from trowel marks and other blemishes.
Resume specified curing without delay.
Complete a sample area of the finished work, size 4 sq m , in advance of the remainder, in an approved location, and obtain approval of appearance before proceeding.

350 NONSLIP TROWELLED FINISH for wearing surfaces:
Float to an even surface with no ridges or steps, then immediately commence curing as specified in section E10.
Successively hand or power trowel at intervals, applying sufficient pressure to close the surface, to give a uniform smooth finish free from trowel marks and other blemishes.
Apply silicon carbide or aluminium oxide, graded between BS 410 sieves 1.7 mm and 500 microns, sprinkling evenly at the rate of 1 kg/sq m and trowel into the surface while the concrete is still plastic.
Resume specified curing without delay.
Complete a sample area of the finished work, size 4sq m, in advance of the remainder, in an approved location, and obtain approval of appearance before proceeding.

510 SURFACE HARDENER: Not less than three weeks after casting, clean surface of concrete by wetting with soap suds and scrubbing with wire brush and fine steel wool. Mop up and scrub with fibre brush and clean water. Allow to dry thoroughly for several days then apply an approved proprietary chemical surface hardener to manufacturer's recommendations.

520 SURFACE SEALER: Apply an approved resin sealer to concrete wearing surface floors in accordance with manufacturer's recommendations.

F10 BLOCK WALLING

To be read with Preliminaries/General conditions.

TYPE(S) OF WALLING

355 CONCRETE LIGHTWEIGHT BLOCKWORK
- Blocks: To BS EN 771-3.
  - Manufacturer: Thermalite.

Product reference: Hi-strength 7.
- Configuration: Solid.
- Compressive strength: Minimum 7.0N / square mm.

Mean value: Not applicable.
Characteristic value: Not applicable.

Category: 1.

- Freeze/ Thaw resistance: Frost resistant.
- Thermal properties: Not applicable.
- Work sizes: Face dimensions 440mm x 215mm.

Thicknesses as indicated.

- Special shapes: None.
- Additional requirements: None.

- Mortar: As section Z21.
  - Standard: Not applicable.
  - Mix: 1:1:6 cement:lime:sand.
  - Additional requirements: None.

Bond: Half lap stretcher.

357 CONCRETE BLOCKWORK GENERALLY.

- Blocks: To BS EN 771-3.
  - Manufacturer: Contractors choice

Product reference: Blockwork

- Configuration: Solid.
- Compressive strength: Minimum 7.0N / square mm.

Mean value: Not applicable.
Characteristic value: Not applicable.
Category: 1.

- Freeze/ Thaw resistance: Frost resistant.
- Thermal properties: Not applicable.
- Work sizes: Face dimensions 440mm x 215mm.

Thicknesses as indicated.

- Special shapes: None.
- Additional requirements: None.

- Mortar: As section Z21.
  - Standard: Not applicable.
  - Mix: 1:1:6 cement:lime:sand.
  - Additional requirements: None.

Bond: Half lap stretcher.

WORKMANSHIP GENERALLY

440 CONDITIONING OF CONCRETE BRICKS/ BLOCKS

- Autoclaved concrete bricks/ blocks delivered warm from manufacturing process: Do not use.
- Age of nonautoclaved concrete bricks/ blocks: Do not use until at least four weeks old.
- Avoidance of suction in concrete bricks/ blocks: Do not wet.
  - Use of water retaining mortar admixture: Submit details.

500 LAYING GENERALLY:

- Lay bricks/blocks on a full bed of mortar; do not furrow. Fill all cross joints and collar joints; do not tip and tail.
- Build walls in stretching half lap bond when not specified otherwise.
- Plumb perpends of facework every third or fifth cross joint along a course and even out the joint widths in between.

535 HEIGHT OF LIFTS:

- Rack back when raising quoins and other advance work.
  Do not use toothing.
- Raise no portion of the work more than 1.2m above another at any time.
-

545 LEVELLING OF SEPARATE LEAVES USING CEMENT GAUGED OR HYDRAULIC LIME MORTAR

- Locations for equal levelling of cavity wall leaves: As follows:
  - Every course containing vertical twist type ties or other rigid ties.
  - Every third tie course for double triangle/ butterfly ties.
  - Courses in which lintels are to be bedded.

610 SUPPORT OF EXISTING WORK: Where new lintels or walling are to support existing structure, completely fill top joint with semi dry mortar, hard packed and well rammed to ensure full load transfer after removal of temporary supports.

635 JOINTING

- Profile: Consistent in appearance.

645 ACCESSIBLE JOINTS NOT EXPOSED TO VIEW

- Jointing: Struck flush as work proceeds.

665 POINTING TO CONCRETE BLOCK WALLS

- Joint preparation: Remove debris. Dampen surface.
- Mortar: As section Z21.
  - Standard: Not applicable.
  - Mix: 1:1:6 cement / lime / sand.
  - Additional requirements: None.
- Profile: Flush.
-

670 FIRE STOPPING: Fill joints around joist ends built into cavity walls with mortar to seal cavities from interior of building.

690 ADVERSE WEATHER

- General: Do not use frozen materials or lay on frozen surfaces.
- Air temperature requirements: Do not lay bricks/ blocks:
  - In cement gauged mortars when at or below 3°C and falling or unless it is at least 1°C and rising.
  - In hydraulic lime:sand mortars when at or below 5°C and falling or below 3°C and rising.
  - In thin joint mortar glue when outside the limits set by the mortar manufacturer.
- Temperature of walling during curing: Above freezing until hardened.
- Newly erected walling: Protect at all times from:
  - Rain and snow.
  - Drying out too rapidly in hot conditions and in drying winds.

ADDITIONAL REQUIREMENTS FOR FACEWORK

710 THE TERM FACEWORK

- Definition: Applicable in this specification to all brick/ block walling finished fair.

- Painted facework: The only requirement to be waived is that relating to colour.

740 FINISHED MASONRY WORK REFERENCE PANELS

- General: Before proceeding to construct the following walling types, construct panels as specified. Give notice when panels are dry.
- Selection masonry units: Reasonably representitive of the average quality of the areas to be constructed.
- Panel types:
  - Walling type: Fair face blockwork as per clause 255.

  Location: In good natural light and with a minimum viewing distance of 3 metres.
  Size: 1.5m x 1.5m.
  Other requirements: Door / window reveal.

750 COLOUR CONSISTENCY OF MASONRY UNITS

- Colour range: Submit proposals of methods taken to ensure that units are of consistent and even appearance within deliveries.
- Conformity: Check each delivery for consistency of appearance with previous deliveries and with approved reference panels; do not use if variation is excessive.
- Finished work: Free from patches, horizontal stripes and racking back marks.

760 APPEARANCE

- Brick/ block selection: Do not use units with damaged faces or arrises.
- Cut masonry units: Where cut faces or edges are exposed cut with table masonry saw.
- Quality control: Lay masonry units to match relevant reference panels.
  - Setting out: To produce satisfactory junctions and joints with built-in elements and components.
  - Coursing: Evenly spaced using gauge rods.
- Lifts: Complete in one operation.
- Methods of protecting facework: Submit proposals.

780 GROUND LEVEL

- Commencement of facework: Not less than 150 mm below finished level of adjoining ground or external works level.

790 PUTLOG SCAFFOLDING

- Use: Not permitted in facework.

800 TOOTHED BOND

- New and existing facework in same plane: Bond together at every course to achieve continuity.

830 CLEANLINESS

- Facework: Keep clean.
- Mortar on facework: Allow to dry before removing with stiff bristled brush.
- Removal of marks and stains: Rubbing not permitted.

F30 ACCESSORIES / SUNDRY ITEMS FOR BRICK / BLOCK / STONE WALLING

To be read with Preliminaries/General conditions.

REINFORCING / FIXING ACCESSORIES

CAVITIES

110 CONCRETE FILL TO BASE OF CAVITY
- Concrete generally: To BS EN 206-1 and BS 8500-2.
  - Designated concrete: GEN 1.
    Workability: High.
- Extent: Maintain 75 mm between top of fill and external ground level and a minimum of 225 mm between top of fill and ground level dpc.
Placement: Compact to eliminate voids.

120 CLEANLINESS
- Cavity base and faces, ties, insulation and exposed dpcs: Free from mortar and debris.

132 PERPEND JOINT PLASTICS WEEP HOLES
- Manufacturer: Cavity Trays Limited; Yeovil, Somerset.
  - Product reference: Small Weepvent.
- Locations: Through outer leaf immediately above base of cavity, at cavity trays, stepped dpcs and external openings. 75 mm above top of cavity fill at base of cavity.
- Provision: At not greater than 1000 mm centres and not less than two over each opening.

155 PARTIAL FILL CAVITY INSULATION
- Insulation: PIR foam boards.
  - Standard: BS EN 13165.
- Manufacturer: Celotex.
  - Product reference: Tuff-R TM Zero CW3000Z.
- Face size (length x width): To suit wall tie spacing.
- Thickness (nominal): 50mm.
- Thermal conductivity: 0.023 W/mK.
- Reaction to fire class: Class D/s2/d0.
- Additional requirements: None.
- Placement: Secure against face of inner leaf.
  - Residual cavity: Clear and unobstructed.
- Joints between boards, at closures and penetrations: No gaps and free from mortar and debris.

171 VENTILATION DUCTS IN EXTERNAL WALLING
- Manufacturer: As specified / required by heating / ventilation specialist.
- Placement: Across cavity, sloping away from inner leaf. Full mortar joints to seal cavity.
- Protection from water penetration to inner leaf: Where barrier is not integral to duct, form stepped dpc cavity tray with stop ends above duct, extending 150 mm on each side.

180 CAVITY CLOSERS FOR JAMBS OF OPENINGS IN NEW EXTERNAL CAVITY WALLS.
- Manufacturer: Cavity Trays Limited; Yeovil, Somerset.
  - Product reference: Quickcloser.

REINFORCING/ FIXING ACCESSORIES

214 CAVITY WALL TIES TO ALL CAVITY WALLS WITHOUT INSULATION.

- Standard: To BS EN 845-1.
    - Type: 1. (Masonry heavy duty).
- Manufacturer: Contractor's choice.
- Material/ finish: Ferritic stainless steel.
- Sizes: In accordance with manufacturer's requirements for 100mm cavity.
- End types: Symmetrical deformed plate for mortar bedding.
- Design embedment length (minimum): 50mm.
- Movement: Non tolerant.
- Additional requirements: None.

215 CAVITY WALL TIES USED TO ALL CAVITY WALLS INCORPORATING PARTIAL FILL INSULATION.

- Standard: To BS EN 845-1.
    - Type: 1. (Masonry heavy duty).
- Manufacturer: Contractor's choice.
- Material/ finish: Ferritic stainless steel.
- Sizes: In accordance with manufacturer's requirements for 100mm wide cavity.
- End types: Symmetrical deformed plate for mortar bedding.
- Design embedment length (minimum): 50mm.
- Movement: Non tolerant.
- Additional requirements: None.
- Tie mounted insulation retaining clips: As recommended by tie manufacturer.

225 FIXING TIES IN MASONRY CAVITY WALLS

- Embedment in mortar beds (minimum): 50 mm.
- Placement: Sloping slightly downwards towards outer leaf, without bending. Drip centred in the cavity and pointing downwards.
- Spacing: Staggered in alternate courses.
    - Horizontal centres: 750mm maximum.
    - Vertical centres: 450mm maximum.
- Additional ties: Provide within 225 mm of reveals of unbonded openings.
    - Spacing: At every course.

233 FIXING TIES IN MASONRY CAVITY WALLS WITH PARTIAL FILL CAVITY INSULATION

- Embedment in mortar beds (minimum): 50 mm.
- Placement: Sloping slightly downwards towards outer leaf, without bending. Drip centred in the cavity and pointing downwards.
- Spacing: Evenly space in non staggered horizontal and vertical rows.
    - Horizontal centres: 750mm maximum.
    - Vertical centres: 450mm maximum.
- Spacing centres of top (eaves) row of ties: 450mm maximum.
- Provision of additional ties: Within 225 mm of reveals of unbonded openings.

Spacing: At every course.

241 WALL STARTERS/CONNECTORS:

- Manufacturer and reference: Furfix profile with 12mm thick Schlegal board
  Material/finish: stainless steel

FLEXIBLE DAMP PROOF COURSES / CAVITY TRAYS

FLEXIBLE DAMP PROOF COURSES/ CAVITY TRAYS

310 DAMP PROOF COURSES GENERALLY.Standard: To BS 6358.

311 DAMP PROOF COURSE – BITUMEN BASED – TO COPINGS.
Standard: To BS 6358. - Manufacturer: Monarflex Anderson (icopal).
Product reference: Xtra – Load Ledkore.

330 DAMP PROOF COURSE:
Manufacturer and reference: Hyload Pitch Polymer or equal

345 SITE FORMED FLEXIBLE SHEET CAVITY TRAYS.
- Material: Pitch Polymer.
- Manufacturer: Monarflex Anderson (icopal).
  - Product reference: Xtra – Load Ledumite.
  -

INSTALLATION OF DPCS/ CAVITY TRAYS

415 HORIZONTAL DPCS
- Placement: In continuous lengths on full even bed of fresh mortar, with 100 mm laps at joints and full laps at angles.
- Width: At least full width of leaf unless otherwise specified. Edges of dpc not covered with mortar or projecting into cavity.
- Overlying construction: Immediately cover with full even bed of mortar to receive next masonry course.
- Overall finished joint thickness: As close to normal as practicable.

425 GROUND LEVEL DPCS
- Joint with damp proof membrane: Continuous and effectively sealed.

435 STEPPED DPCS IN EXTERNAL WALLS
- External walls on sloping ground: Install dpcs not less than 150 mm above adjoining finished ground level.

445 SILL DPCS
- Form and placement: In one piece and turned up at back when sill is in contact with inner leaf.

455 COPING/ CAPPING DPCS
- Placement: Bed in one operation to ensure maximum bond between masonry units, mortar and dpc.
- Dpcs crossing cavity: Provide rigid support to prevent sagging.

465 SEALING DPCS TO PARAPET WALLS.
Overlaps and junctions: Seal with double sided adhesive tape.

475 SITE FORMED CAVITY TRAYS
- Requirements to prevent downward ingress of water:
  - Profiles: To match those shown on drawings. Firmly secured.
  - Joint treatment: Use unjointed wherever possible, otherwise lap at least 100 mm and seal to produce a free draining and watertight installation.
  - Horizontal cavity trays: Support using cavity closer.
  - Sloping cavity trays: Prevent sagging.

- Cleanliness: Free from debris and mortar droppings.

485 CAVITY TRAYS OVER OPENINGS AND OTHER CAVITY BRIDGINGS
- Length: To extend not less than 150 mm beyond ends of lintels/ bridgings.

515 DPC/ CAVITY TRAY LEADING EDGE IN FACEWORK - FLUSH
- Treatment at face of masonry: Finish flush and clear of mortar at the following locations: At window and door heads.

560 VERTICAL DPCS GENERALLY
- Form: In one piece wherever possible.
- Joints: Upper part overlapping lower not less then 100 mm.

570 JAMB DPCS AT OPENINGS
- Joint with cavity tray/ lintel at head: Full underlap.
- Joint with sill/ horizontal dpc at base: Full overlap.
- Projection into cavity: Not less than 25 mm.
- Relationship with frame: In full contact.

580 JAMB DPCS TO BUILT IN TIMBER FRAMES
- Fixing: Securely fastened to back of frame.
- Fasteners: Galvanized clout nails or staples.

JOINTS

650 POINTING IN FLASHINGS
- Joint preparation: Free of debris and lightly wetted.
- Pointing mortar: As for adjacent walling.
- Placement: Fill joint and finish flush.

660 PINNING UP TO SOFFITS
- Top joint of loadbearing walls: Fill and consolidate with mortar.

PROPRIETARY CILLS / LINTELS / COPINGS / DRESSINGS

110 SLATE CILLS
- Supplier: Delabole
- Thickness 40mm
- Bedding: St Astier 3.5/CLS35 sand 1:3

250 REINFORCEMENT:
- Type of reinforcement, unless otherwise specified: To BS 4449 and/or BS 4483, cut and bent to BS 4466. Simple reinforcement, for example setting between lintels to tie old walls, may be bent on site.

730 PRECAST CONCRETE LINTELS:
- To BS 5977:Part 2.
  Manufacturer and reference: Contractors choice
- Bed on mortar used for adjacent work with bearing of not less than 150mm unless specified otherwise. Use slate packing pieces.

750 STEEL LINTELS:
- To BS 5977:Part 2.
  Manufacturer and reference: IG or Catnic

- Bed on mortar used for adjacent work with bearing of not less than 150mm unless specified otherwise.

840 TEMPLATES: Where frames are not to be built in (specified elsewhere) form openings using rigid templates accurately fabricated to the required size.

MISCELLANEOUS ITEMS

840 OPENINGS FOR FRAMES
- Formation: Use accurate, rigid templates to required size.

850 WALL PLATES
- Placement: On full bed of mortar to correct horizontal level.
-

G10 STRUCTURAL STEEL FRAMING

To be read with Preliminaries/General conditions and the latest edition of the National Structural Steelwork Specification for Building Construction.

GENERAL REQUIREMENTS/INFORMATION

110 DESIGN:
The structural steelwork shown on the drawings and described in this specification has been designed to BS 5950 where applicable, unless stated otherwise.
Steel grade(s): 43
Complete the design and detailing of connections to BS 5950 to satisfy loading requirements specified or otherwise calculable from the information given.

125 SPECIFICATION:
Comply with the latest edition of the National Structural Steelwork Specification (hereinafter called the NSSS) unless specified otherwise in this section.
Ensure that a copy of the NSSS is available at all times during the course of the Works at the fabrication shop and on site.

ERECTION METHOD STATEMENT to be submitted at least 7 days before starting erection of steelwork, including details of (with drawings if necessary) :

Method and sequence of erection.
Type of cranage.
Temporary guys and bracing proposed for use during erection.

FABRICATION GENERALLY

150 GENERAL REQUIREMENTS:
Inform CA when fabrication is due to start. Do not fabricate steelwork for which the drawings have

not been checked by CA.
Before fabricating, ensure that surface condition of steel that is to be coated complies with requirements for cleaning given elsewhere in this specification.
Ensure that fabrication processes do not cause changes in properties of materials resulting in non-compliance with specified requirements.

WELDING

255 **WELDING ON SITE**: Not withstanding NSSS clause 8.7, site welding is not permitted unless shown on drawings or otherwise approved. When permitted, ensure suitable, safe working conditions. Do not weld when surfaces are wet or when the ambient temperature is below 0 degC.

290 **FINISHING WELDS**: Carefully dress welds to remove slag by light hammering, wire brushing or other methods that do not deform the surface of the weld.

310 **GALVANIZED FINISH TO BOLT ASSEMBLIES**:
To BS 729, applied by fastening manufacturer and passivated when no additional coatings are specified. Nuts to be tapped after galvanising.

390 **SEALED HOLLOW SECTIONS**: Seal bolt holes to prevent access of moisture. If method of sealing is not specified, submit proposals for approval.

ERECTION

410 **BEFORE COMMENCING ERECTION**:
Not less than 7 days before proposed start date, check foundations and other structures to which steelwork will be attached for accuracy of setting out, and holding down bolts for position, protruding length, condition and slackness.
Report any inaccuracies and defects to Main Contractor and CA without delay.
Obtain permission of CA to commence erection.
Where fixings are visible they shall all be in the same manner. That is if bolt heads are visible from the space then all fixings viewed from that place should be bolt heads – not a mixture.

425 **MODIFICATIONS**:
Inform CA of any defects due to detailing or fabrication errors.
Obtain approval of methods of rectification before starting modification or remedial work.

440 **COLUMN BASES**:
Raise or lower to levels specified on the drawing(s) using sawn steel packs or folding wedges not larger than necessary for the purpose.
Position packs symmetrically around perimeter of base plate; do not use a single central pack.
Notify CA when the space beneath any column base is less than, or over 25 mm greater than the specified dimension.
Check accuracy of erection and correct all errors before filling and bedding beneath bases and carrying out any other adjacent work.

MORTAR FILLING/BEDDING OF COLUMN BASES: Completely fill bolt pockets with a neat cement slurry and the space beneath column base plates with grout or mortar as follows:
SBD Five Star Grout.

GENERAL REQUIREMENTS FOR PROTECTIVE COATING WORK

515 OPERATIVES must be appropriately skilled and experienced in the use of specified materials and methods of application.

520 COATING MATERIALS:
Wherever possible, to be from one manufacturing batch. Where more than one batch is to be used, keep separate, allocate to distinct parts or areas of the work, and inform the CA accordingly.
Check that all coating materials to be used are recommended by their manufacturers for the particular surface and conditions of exposure, and that they are compatible with each other.

521 ALTERNATIVE MANUFACTURERS: Coating materials to be obtained from one only of the following manufacturers unless specified otherwise. Inform CA of selected manufacturer at an early date.

540 HANDLING AND STORING COATED STEELWORK:
Use methods and equipment that will minimise chafing, chipping and other damage to coated components.
Ensure an adequate drying/curing period for each coat before handling.
Use suitable packing, lashings, lifting harnesses, nylon slings, rubber-protected chains and chocks, etc.
Stack coated components clear of the ground, separated by timber chocks, and so that ponding does not occur.

550 REMEDIAL WORK:
Early degradation of coatings by blistering, peeling, flaking, cracking, lack of adhesion, etc. must be made good by complete removal, preparation and reapplication of all coats, as instructed.
Inadequate dry film thickness or surface defects due to adverse weather may, depending on the type of paint, be remedied by rubbing down and applying further coat(s), as instructed.
Mechanical damage to coatings must be made good by local cutting back of coatings, preparation and reapplication of all coats to leave a neat, continuous and flat finish.
Where damage to coatings or subsequent surface preparation has exposed bare metal, it must be thoroughly cleaned and primed within two hours.

PROTECTIVE COATING SYSTEM(S)

620 GALVANIZING: Railings and supports
Use/location: All exposed and inaccessible locations
Preparation: Blast cleaning to BS 7079:Part 1A, preparation grade Sa2 using chilled iron grit grade G24 to give a coarse surface profile, followed by acid pickling.
Galvanizing: To BS 729, minimum average coating thickness 140 micrometres

COATING FOR STEEL
Use/location: As instructed by the PM.
Paint Manufacturer: Use one of the paint systems shown on the attached table
Intumescent paint system as specified in Specification M61

710 OFFSITE PREPARATION AND PAINTING to be carried out under cover in properly lit, heated and ventilated conditions. Select sequence of working from one of the following and inform CA before starting work:
Fabricate - blast clean - prime as specified
Blast clean - fabricate - prime as specified (Immediately before priming remove flash rust with a light overall sweep blast), or
Blast clean - prime with a weldable prefabrication primer recommended by the manufacturer of the specified primer - fabricate - prime as specified (Thickness of post-fabrication priming coat may be reduced if and as recommended by manufacturer).

715 **INACCESSIBLE SURFACES**: The sequence of working must be such as to ensure that surfaces inaccessible after assembly receive the full specified treatment and coating system including, if necessary, local shop application of site coatings.

755 **UNCOATED FASTENINGS**: After erection, thoroughly degrease and clean and, without delay, apply coating(s) to match surrounding shop painted areas before applying specified site coating(s).

760 **GALVANIZED FASTENINGS**: After erection, thoroughly degrease and clean and apply a suitable etch primer before applying specified site coating(s).

850 **JUNCTIONS WITH CONCRETE AND MASONRY:** Where exposed steelwork is partially embedded or encased in concrete or masonry, apply two coats of an approved bituminous coating locally to the steel/concrete junction as instructed by the CA.

G20 CARPENTRY & GENERAL FRAMING

To be read with Preliminaries/General conditions.

GENERAL

105 TIMBER PROCUREMENT

- Timber (including timber for wood based products): Obtained from well managed forests/ plantations in accordance with:
  - The laws governing forest management in the producer country or countries.
  - International agreements such as the Convention on International Trade in Endangered Species of wild fauna and flora (CITES).
- Documentation: Provide either:
  - Documentary evidence (which has been or can be independently verified) regarding the provenance of all timber supplied, or
  - Evidence that suppliers have adopted and are implementing a formal environmental purchasing policy for timber and wood based products.

150 STRENGTH GRADING OF TIMBER

- Grader: A company currently registered under a third party quality assurance scheme operated by a certification body approved by the UK Timber Grading Committee.

160 GRADING AND MARKING OF SOFTWOOD

- Timber of a target/ finished thickness less than 100 mm and not specified for wet exposure: Graded at an average moisture content not exceeding 20% with no reading being in excess of 24% and clearly marked as ‘DRY’ or ‘KD’ (kiln dried).
- Timber graded undried (green) and specified for installation at higher moisture contents: Clearly marked as ‘WET’ or ‘GRN’.
- Structural timber members cut from large graded sections: Regraded to approval and marked accordingly.

TYPE(S) OF TIMBER

210 GRADED SOFTWOOD FOR GENERAL STRUCTURAL WORK

- Stress graded to BS 4978 or other national equivalent and so marked.
  Strength class to BS 5268:Part 2: C 24
  Surface finish: Sawn for general structural joists.
- Preservative Treatment: As section Z12 and British Wood Preserving and Damp-Proofing Association Commodity Specification C 8
  Type/desired service life: 40 yr

215 IROKO FOR EXTERNAL JOINERY

Carefully select Iroko, match sections, cut from site dimensions, machine to take glazing as supplier standard details.

270 UNGRADED SOFTWOOD FOR FRAMING TO BATTENING TO WALL LININGS, AND OTHER GENERAL FRAMING.

- Quality of timber: Free from decay, insect attack (except pinhole borers) and with no knots wider than half the width of the section.
- Surface finish: Sawn.
- Treatment: As section Z12 and Wood Protection Association Commodity Specification C8, Service life: 30 years.

275 WOOD TRIM TO FASCIA BOARDS, DECORATIVE BRACKETS / FRIEZE.

- Species: Contractor's choice.
- Standard: To BS 1186-3.
  - Class: 2.
- Treatment: Organic solvent impregnation to NBS section Z12 and Wood Protection Association Commodity Specification C8, Service life: 30 years.
- Fixing: 2 no. 50mm lost head nails to each support.
- Other requirements: None.

311 PLYWOOD

(Note: Stirling board will not be used anywhere.) - Manufactured to an approved national standard.
Appearance grade: II
Bond type: WBP to BS 6566:Part 8 or equivalent.
Nominal thickness: as drawings.
Brush treat with preservative.

312 NONSTRUCTURAL PLYWOOD TO VALLEY GUTTERS TO ROOF.

- Standard: To an approved national standard.
- Thickness: As indicated on drawings.
- Appearance class to BS EN 635: IV.
- Bond quality to BS EN 314-2: Class 2 .
- Finish: Unsanded.
- Treatment: Organic solvent impregnation to NBS section Z12 and Wood Protection Association Commodity Specification C8, Service life: 30 years.

WORKMANSHIP GENERALLY

401 CROSS SECTION DIMENSIONS OF STRUCTURAL SOFTWOOD AND HARDWOOD

- Dimensions: Dimensions in this specification and shown on drawings are target sizes as defined in BS EN 336.
- Tolerances: The tolerance indicators (T1) and (T2) specify the maximum permitted deviations from target sizes as stated in BS EN 336, clause 4.3:

- Tolerance class 1 (T1) for sawn surfaces.
- Tolerance class 2 (T2) for further processed surfaces.

402 CROSS SECTION DIMENSIONS OF NONSTRUCTURAL SOFTWOOD

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

403 CROSS SECTION DIMENSIONS OF NONSTRUCTURAL HARDWOOD

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

420 WARPING OF TIMBER

- Bow, spring, twist and cup: Not greater than the limits set down in BS 4978 or BS EN 14081-1 for softwood, or BS 5756 for hardwood.

430 SELECTION AND USE OF TIMBER:

- Do not use timber members which are damaged, crushed or split beyond the limits permitted by their grading.
- Ensure that notches and holes are not so positioned in relation to knots or other defects that the strength of members will be reduced.
- Do not use scarf joints, finger joints or splice plates without approval.

440 PROCESSING TREATED TIMBER:

- Carry out as much cutting and machining as possible before treatment. All in the case of PAR sections.
- Retreat all treated timber which is sawn along the length, ploughed, thicknessed, planed or otherwise extensively processed.
- Treat timber surfaces exposed by minor cutting and drilling with two flood coats of a solution recommended for the purpose by main treatment solution manufacturer.

450 MOISTURE CONTENT of timber at time of erection to be not more than:

Under cover in generally unheated spaces: 24%
Under cover in generally heated spaces: 20%
Internal in continuously heated spaces: 20%

510 PROTECTION:

- Keep timber dry and do not overstress, distort or disfigure sections or components during transit, storage, lifting, erection or fixing.
- Store timber and components under cover, clear of the ground and with good ventilation. Support on regularly spaced, level bearers on a dry, firm base. Open pile to ensure free movement of air through the stack.
- Arrange sequence of construction and cover timber as necessary during and after erection to ensure that specified moisture content is not exceeded.
- Keep trussed rafters vertical during handling and storage.
-

530 PAINTED FINISHES

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

540 CLEAR FINISHES

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

550 EXPOSED TIMBER: Prevent damage to and marking of surfaces and arrises of planed structural timber which will be exposed to view in completed work.

JOINTING TIMBER

570 JOINTING/ FIXING GENERALLY

- Generally: Where not specified precisely, select methods of jointing and fixing and types, sizes and spacings of fasteners in compliance with section Z20.

630 BOLTED JOINTS TO TRUSSES

- Locate holes accurately and drill to diameters as close as practical to the nominal bolt diameter and not more than 2mm larger.
- Tighten bolts so that washers just bite the surface of the timber and at least one complete thread protrudes from the nut.
- Check at agreed regular intervals up to Practical Completion and tighten as necessary to prevent slackening of joints.

670 ANTICORROSION FINISHES FOR FASTENERS

- Galvanizing: To BS 7371-6, with internal threads tapped and lightly oiled following treatment.
- Sherardizing: To BS 7371-8, Class 1.
- Zinc plating: To BS EN ISO 4042 and passivated.

ERECTION AND INSTALLATION

760 TEMPORARY BRACING

- Provision: As necessary to maintain structural timber components in position and to ensure complete stability during construction.

770 ADDITIONAL SUPPORTS:

- Where not shown on drawings, position and fix additional studs, noggings or battens for appliances, fixtures, edges of sheets, etc., in accordance with manufacturers' recommendations.
- All additional studs, noggings or battens to be of adequate size and have the same treatment, if any, as adjacent timber supports.

780 WALL PLATES: Ensure that wall plates are:

- Positioned and aligned to give the correct span and level for trusses, joists, etc.
- Fully bedded in fresh mortar.
- In lengths of not less than 3m with half lap joints.

784 INSTALLING JOISTS GENERALLY:

- Position at equal centres not exceeding designed spacing and true to level.
- Install bowed joists with positive camber.
- Position end joists approximately 50mm from masonry walls.

786 INSTALLING JOISTS ON HANGERS:

- Bed hangers directly on and hard against supporting construction. Do not use packs or bed on mortar.
- Cut joists to leave not more than 6mm gap between ends of joists and back of hanger.
- Rebate joists to lie flush with underside of hangers.
- Fix joists to hangers with a nail in every hole.

791 JOIST HANGERS

Material/finish: galv steel

Size: To suit joist, design load and crushing strength of supporting construction.

795 TRIMMING OPENINGS: When not specified otherwise, trimmers and trimming joists to be not less than 25mm wider than general joists.

840 STRUTTING:

- Unless specified otherwise, securely fix solid blocking between joists as follows:

Joist spans Two staggered rows equally spaced.

- Outer joists to be blocked solidly to perimeter walls.

SLATING GENERALLY

210 BASIC WORKMANSHIP

- General: Fix slating and accessories to make the whole sound and weathertight at earliest opportunity.
- Setting out: To true lines and regular appearance, with neat fit at edges, junctions and features.
- Fixings for slating accessories: As recommended by manufacturer.
- Gutters and pipes: Keep free of debris. Clean out at completion.

240 UNDERLAY

- Handling: Do not tear or puncture.
- Laying: Maintain consistent tautness.
- Vertical laps (minimum): 100 mm wide, coinciding with supports and securely fixed.
- Fixing: Galvanized steel, copper or aluminium 20 x 3 mm extra large clout head nails.
- Eaves: Where exposed, underlay must be BS 8747, Annex B, type 5U, or equivalent UV durable type.
- Penetrations: Use proprietary underlay seals or cut underlay to give a watertight fit around pipes and components.
- Ventilation paths: Do not obstruct.

245 BATTENS/ COUNTERBATTENS - TREATED

- Timber: Sawn softwood.
    - Standard: To BS 5534, clause 4.12.1.
    - Permissible characteristics and defects: Not to exceed limits in BS 5534, Annex C.
    - Moisture content at time of fixing and covering (maximum): 22%.

- Preservative treatment: As section Z12 and Wood Protection Association Commodity Specification C8.
    - Type: Organic solvent.

259 COUNTERBATTENS ON RAFTERS
- Fixing: Into rafters at not more than 300 mm centres.

265 BATTEN FIXING
- Setting out: Align parallel to ridge in straight horizontal lines to gauge of slates. Align on adjacent areas.
- Batten length (minimum): Sufficient to span over three supports.
- Joints in length: Square cut. Butt centrally on supports. Joints must not occur more than once in any group of four battens on one support.
- Additional battens: Provide where unsupported laps in underlay occur between battens.
- Fixing: Each batten to each support. Splay fix at joints in length.

275 SLATE FIXING
- Setting out: Lay slates with an even overall appearance with slightly open (maximum 5 mm) butt joints. Align tails.
- Slate thickness: Consistent in any one course. Lay with thicker end as tail.
- Ends of courses: Use extra wide slates to maintain bond and to ensure that cut slates are as large as possible. Do not use slates less than 150 mm wide.
- Top course: Head-nail short course to maintain gauge.
- Fixing: Centre nail each slate twice through countersunk holes 20-25 mm from side edges.
    - Nails: Copper clout to BS 1202-2 or aluminium clout to BS 1202-3.
    - Nail dimensions: Determine in accordance with BS 5534 to suit site exposure, withdrawal resistance and slate supplier's recommendations.

290 MORTAR BEDDING/ POINTING
- Mortar: As section Z21, 1:3 cement:sand, with plasticizing admixtures permitted.
    - Bond strength providing resistance to uplift: To BS 5534.
- Weather: Do not use in wet or frosty conditions or when imminent.
- Preparation of concrete and clay tile accessories to be bedded: Wet and drain surface water before fixing.
- Appearance: Finish neatly as work proceeds and remove residue.

H71 LEAD/COPPER SHEET COVERINGS/FLASHINGS

To be read with Preliminaries/General conditions.

TYPES OF LEADWORK

410 APRON FLASHINGS GENERALLY
- Lead:
    - Thickness: 2.00mm or 2.24mm (Code 5).
- Dimensions:

- Lengths: Not more than 1500mm.
- End to end joints: Laps of not less than 100 mm.
- Upstand: Not less than 75 mm.
- Cover to abutment: Not less than 300mm.

– Fixing: Lead wedges into bed joint, clips to bottom edge at laps and 500mm centres.

498 COMBINED LEAD DAMP PROOF COURSE/ CAVITY TRAY AND COVER FLASHING AT HORIZONTAL ABUTMENTS

- Lead:
  - Thickness: 2.00mm or 2.24mm (Code 5).
  - Finish: Fully coated on both sides with high-build, bitumen based paint on the surfaces which are to be embedded.
- Length: Not more than 1500 mm.
- Cover of flashing: Not less than 300mm.
- Joints: Leadweld gusset upstand not less than 100 mm from end of each length, coinciding with vertical mortar joint in wall. Lap adjoining length over gusset upstand.
- Laying: On a thin even bed of wet mortar.
  - Next layer of overlying construction: Bed on mortar without delay and finish joint neatly.

– Fixing cover flashing: With clips at laps and at 500mm centres.

GENERAL REQUIREMENTS/ PREPARATORY WORK

510 WORKMANSHIP GENERALLY

- Standard: To BS 6915 and latest edition of 'Rolled lead sheet. The complete manual' published by the Lead Sheet Association.
- Fabrication and fixing: To provide a secure, free draining and completely weathertight installation.
- Operatives: Trained in the application of lead coverings/ flashings. Submit records of experience on request.
- Preforming: Measure, mark, cut and form lead prior to assembly wherever possible.
- Marking out: With pencil, chalk or crayon. Do not use scribers or other sharp instruments without approval.
- Bossing and forming: Straight and regular bends, leaving sheets free from ripples, kinks, buckling and cracks.
- Solder: Use only where specified.
- Sharp metal edges: Fold under or remove as work proceeds.
- Finished work: Fully supported, adequately fixed to resist wind uplift but also able to accommodate thermal movement without distortion or stress.
  - Protection: Prevent staining, discolouration and damage by subsequent works.

515 LEADWELDING

- In situ leadwelding: Not permitted.

520 LEAD SHEET

- Production method:
  - Rolled, to BS EN 12588, or
  - Machine cast, Agrément certified and to code thicknesses with a tolerance (by weight) of ±5%, or

- Sand cast, from lead free from bitumen, solder, other impurities, inclusions, laminations, cracks, air, pinholes and blowholes; to code thicknesses but with a tolerance (by weight) of ±10%.

- Identification: Labelled to show thickness/ code, weight and type.

610 SUITABILITY OF SUBSTRATES

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

640 TIMBER FOR USE WITH LEADWORK

- Quality: Planed, free from wane, pitch pockets, decay and insect attack (ambrosia beetle excepted).
- Moisture content: Not more than 22% at time of fixing and covering. Give notice if greater than 16%.
- Preservative treatment: Organic solvent as section Z12 and Wood Protection Association Commodity Specification C8.

650 UNDERLAY

- Manufacturer: Contractor's choice.
  - Product reference: 220g/sq m needle punched geotextile.
- Handling: Prevent tears and punctures.
- Laying: Butt or overlap jointed onto a dry substrate.
  - Fixing edges: With copper or stainless steel staples or clout nails.
  - Do not lay over roof edges but do turn up at abutments.
- Wood core rolls: Fixed over underlay.
- Protection: Keep dry and cover with lead at the earliest opportunity.

FIXING LEAD

705 HEAD FIXING LEAD SHEET

- Top edge: Secured with two rows of fixings, 25 mm and 50 mm from top edge of sheet, at 75 mm centres in each row, evenly spaced and staggered.
- Sheets less than 500 mm deep: May be secured with one row of fixings, 25 mm from top edge of sheet and evenly spaced at 50 mm centres.

710 FIXINGS

- Nails to timber substrates: Copper clout nails to BS 1202-2, or stainless steel (austenitic) clout nails to BS 1202-1.
  - Shank type: Annular ringed, helical threaded or serrated.
  - Shank diameter: Not less than 2.65 mm for light duty or 3.35 mm for heavy duty.
  - Length: Not less than 20 mm or equal to substrate thickness.
- Screws to concrete or masonry substrates: Brass or stainless steel to BS 1210, tables 3 or 4.
  - Diameter: Not less than 3.35 mm.
  - Length: Not less than 19 mm.
  - Washers and plastic plugs: Compatible with screws and lead.
- Screws to composite metal decks: Self tapping as recommended by the deck and lead manufacturer/ supplier for clips.

715 CLIPS

- Manufacturer: Fabricated on site.
- Material:
  - Lead clips: Cut from sheets of same thickness/ code as sheet being secured.
  - Stainless steel clips:
    Thickness: 0.71.
    Grade: BS EN 10088, 1.4301(304) terne coated if exposed to view.
- Dimensions:
  - Width: 50 mm where not continuous.
  - Length: To suit detail.
- Fixing clips: Secure each to substrate with either two screw or three nail fixings not more than 50 mm from edge of lead sheet. Use additional fixings where lead downstands exceed 75 mm.

770 WEDGE FIXING INTO JOINTS/ CHASES
- Joint/ chase: Rake out to a depth of not less than 25 mm.
- Lead: Dress into joint/ chase.
  - Fixing: Lead wedges at not more than 450 mm centres, at every change of direction and with at least two for each piece of lead.
- Sealant: Performance requirements in accordance with BS EN ISO 11600.
  - Application: As section Z22.

780 WEDGE FIXING INTO DAMP PROOF COURSE JOINTS
- Joint: Rake/ cut out under damp proof course to a depth of not less than 25 mm.
- Lead: Dress lead into joint.
  - Fixing: Lead wedges at not more than 450 mm centres, at every change of direction and with at least two for each piece of lead.
- Sealant: Performance requirements in accordance with BS EN ISO 11600.
  - Application: As section Z22.

790 SCREW FIXING INTO JOINTS/ CHASES
- Joint/ chase: Rake out to a depth of not less than 25 mm.
- Lead: Dress into joint/ chase and up back face.
  - Fixing: Into back face with stainless steel screws and washers and plastics plugs at not more than 450 mm centres, at every change of direction, and with at least two fixings for each piece of lead.
- Sealant: To accord with BS EN ISO 11600.
  - Application: As section Z22.

JOINTING LEAD

810 FORMING DETAILS
- Method: Bossing or leadwelding except where bossing is specifically required.
- Leadwelded seams: Neatly and consistently formed.
  - Seams: Do not undercut or reduce sheet thickness.
  - Filler strips: Of the same composition as the sheets being joined.
  - Butt joints: Formed to a thickness one third more than the sheets being joined.
  - Lap joints: Formed with 25 mm laps and two loadings to the edge of the overlap.

- Bossing: Carried out without thinning, cutting or otherwise splitting the lead sheet.
- Details where bossing must be used: Not applicable.

970 PATINATION OIL
- Manufacturer: Contractor's choice.
- Location: Where run off of rainwater drains on to slate roofs.
- Application: As soon as practical, apply a smear coating to lead, evenly in one direction and in dry conditions.

TYPE(S) OF LEADWORK/COPPERWORK

360 FLUE (M&E) FLASHINGS:
- Drawing reference(s): As existing
- Front apron:
Lead: Code 5
Dimensions:
Length: Width of chimney plus not less than 150mm under lap to each side flashing.
Upstand: Not less than 75mm.
Cover to roof: Not less than 100mm.
Fixing: Lead wedges into bed joint.
- Soakers:
Lead: Code 3 cut and dressed to shape for fixing by roofer.
Dimensions:
Length: Slate/tile gauge + lap + 25 mm.
Upstand: Not less than 75mm.
Under lap: Not less than 100mm.
- Step flashings:
Lead: Code 5 in lengths not exceeding 1500mm.
End to end joints: Laps of not less than 100mm.
Front end: Turn 75mm around chimney over apron.
Cover: Overlap to soaker upstands of not less than 65mm.
Fixing: Lead wedges at every course.
- Back gutter:
Lead: Code 6
Dimensions:
Length: Width of chimney plus not less than 100mm overlap to each side flashing.
Upstand: Not less than 100mm.
Gutter sole: Not less than 150mm.
Cover up roof not less than 225mm.
- Back gutter cover flashing:
Lead: Code 5
Dimensions:
Length: Width of chimney plus not less than 100mm overlap to each side flashing.
Cover: Overlap to back gutter upstand of not less than 75mm.
Fixing: Lead wedges into bed joint.

GENERAL REQUIREMENTS / PREPARATORY WORK

510 WORKMANSHIP GENERALLY:

- Cut, joint and dress lead neatly and accurately, to provide fully waterproof coverings/flashings, free from ripples, kinks, buckling and cracks.
- Comply with BS 6915 and current good practice as described in the latest editions of 'The Lead Sheet Manual' published by the Lead Sheet Association, unless specified or agreed otherwise.
- Do not use scribers or other sharp instruments to mark out lead.
- Use solder only where specified.
- Ensure that finished leadwork is fully supported, adequately fixed to resist wind uplift but also able to accommodate thermal movement without distortion or stress.

515 IN SITU WELDING: will not be permitted.

516 IN SITU WELDING: is permitted, subject to completion of a 'hot work permit' form and compliance with its requirements.

550 LEAD SHEET: Colour marked for thickness and weight and of the type and code specified:
- Milled, to BS 1178, or
- Machine cast, to BS 1178 in respect of general quality, chemical composition and tolerance on thickness, or
- Sand cast, from lead complying with BS 1178 and free from bitumen, solder, other impurities, inclusions, laminations, cracks, air, pinholes and blow holes. Thickness(es) as BS 1178 but with a tolerance of +/-10%.

610 SUITABILITY OF BASES:
- Bases to be dry and free of dust, debris, grease and other deleterious matter.
- Laying of lead will be taken as joint acceptance by the Main Contractor and Subcontractor of the suitability of bases.

620 PREPARATION OF EXISTING TIMBER BASES: Inform CA of any defective boards and comply with instructions for replacement. Ensure that all boards are securely fixed. Punch in any protruding fastenings and plane or sand as necessary to achieve an even surface.

650 TIMBER FOR USE WITH LEADWORK:
- Planed, free from wane, pitch pockets, decay and insect attack except pinhole borers.
- Moisture content: Not more than 22% at time of covering.
- Preservative treatment: CCA as section Z12 and British Wood Preserving Association Commodity Specification C8.

FIXING / JOINTING LEAD/COPPER

710 HEAD FIXING LEAD SHEET:
- Where not specified otherwise, secure top edge of lead sheets with two rows of fixings, 25mm and 50mm from top edge of sheet, at 75mm centres in each row, evenly spaced and staggered.
- Sheets less than 500mm deep may be secured with one row of fixings, 25mm from top edge of sheet and evenly spaced at 50mm centres.

715 FIXINGS:
- Where not specified otherwise, fix lead sheet to timber substrates with:

Copper clout nails to BS 1202:Part 2, table 2, with annular ring, helical ring or serrated shank, length not less than 20mm, shank diameter not less than 3.35mm and head diameter not less than 8mm, or

Stainless steel (austenitic) clout nails with annular ring, helical ring or serrated shank, length not less than 19mm, shank diameter not less than 2.65mm and head diameter not less than 8mm.

- Where not specified otherwise, fix lead sheet to concrete or masonry substrates with:

Brass or stainless steel screws to BS 1210, table 3, length not less than 19mm and diameter not less than 3.35mm, with washers of the same material and plastics plugs of length and diameter to suit screws.

720 CLIPS:

- Generally 50mm wide where not specified to be continuous, length to suit detail.
- Lead clips to be cut from sheets of same code as sheet being secured.
- Copper clips to be cut from 6mm thick sheet to BS 2870, temper grade 1/4H, dipped in solder if exposed to view.
- Stainless steel clips to be cut from 6mm sheet to BS 1449:Part 2, grade 304, terne coated if exposed to view.
- Unless specified otherwise fix each clip with two fastenings not more than 50mm from edge of lead sheet. Clips welted around edges of sheets to be turned over 25mm.

724 CONTINUOUS CLIPS:

- Width to suit detail.
- Lead continuous clips to be cut from code 6 sheet.
- Copper continuous clips to be cut from 6 mm thick sheet to BS 2870.
- Stainless steel continuous clips to be cut from 6mm thick sheet to BS 1449:Part 2, grade 304.
- Unless specified otherwise fix at 6mm centres. Welt edge of lead sheet around continuous clip and dress down.

750 HOLLOW ROLL JOINTS:

- Form with a 125mm over cloak, 100mm under cloak and copper or stainless steel clips as clause 720 at not more than 450mm centres.
- Welt over cloak and clip around under cloak, and turn over to form a roll of consistent cross section.

770 WELTED JOINTS:

- Form with a 50mm overlap, 25mm underlip and copper or stainless steel clips as clause 720 at not more than 450mm centres.
- Welt overlap and clips around under lap, loosely turn over and lightly dress down.

780 DRIPS WITH SPLASH LAPS:

- Dress under lap into rebate along top edge of drip and fix with one row of nails at 50mm centres on centre line of rebate.
- Dress overlap over drip and form a 40mm splash lap.

781 DRIPS WITH SPLASH LAPS:

- Dress under lap up full height of drip upstand. Fix to lower level base with two rows of nails 25mm and 50mm from face of drip, at 75mm centres in each row, evenly spaced and staggered. Seal over nails with a soldered or lead welded dot.

- Dress overlap over drip and form a 75mm splash lap. Secure with lead clips as clause 720, lead welded to under lap, with not less than one per bay.

790 DRIPS WITHOUT SPLASH LAPS:
- Dress under lap into rebate along top edge of drip and fix with one row of nails at 50mm centres on centre line of rebate.
- Dress overlap over drip to just short of lower level.

820 WEDGE FIXING INTO JOINTS/CHASES:
- Carefully rake out joint/chase to a depth of not less than 25mm.
- Dress lead into joint/chase and fix with lead wedges at not more than 450mm centres, at every change of direction and with at least two for each piece of lead.
- Prepare joint/chase and apply sealant as section Z22.
  Sealant: Polysulphide

830 WEDGE FIXING INTO DAMP PROOF COURSE JOINTS:
- Carefully rake/cut out joint under damp proof course to a depth of not less than 25mm.
- Dress lead into joint and fix with lead wedges at not more than 450mm centres, at every change of direction and with at least two for each piece of lead.
- Prepare joint and apply sealant as section Z22.
  Sealant: Polysulphide

880 FINISHING: As soon as practical, apply a smear coating of patination oil, evenly in one direction and in dry conditions, to all surfaces

J30 LIQUID APPLIED TANKING / DAMP PROOFING

To be read with Preliminaries / General conditions.

TYPES OF TANKING / DAMP PROOFING

110 COLD APPLIED TANKING
- Substrate : ……

-Primer : RIW Flexiseal Primer.
- Application : Number of coats : 1 No. minimum.
  Coverage per coat (minimum) : 10m² / litre.
- Coating : Moisture curing polyurethane elastomer.
- Manufacturer : RIW Limited, Arc House, Terrace Road South, Binfield, RG42 4PZ.
  Tel : 01344 397777 Fax : 01344 862010
  E-mail : technical@riw.co.uk Web : www.riw.co.uk
  Product reference : RIW Flexiseal.
- Application : Number of coats : 2 No. (1st coat Grey, 2nd coat Black).
  Coverage per coat (minimum) : 2m² / kg.
- Reinforcement : Not required.
- Blinding : Not required.

EXECUTION

205 A SUITABILITY OF SUBSTRATE
- Substrates generally :

- Smooth, even textured, clean, dry and frost free.
- Within tolerances for level and surface regularity.
- Vertical and horizontal surfaces : Correctly prepared and free from irregularities.
- Moisture content and stability of substrate : Must not impair integrity of finished tanking / damp proofing.
- Preliminary work : Complete including :
    - Chases.
    - External angles.
    - Formation of upstands and kerbs.
    - Movement joints.
    - Penetrations / Outlets.

207 PRIMERS

-Application : Uniform, continuous coverage.

210 COATING APPLICATION

-Adjacent surfaces exposed to view in finished work : Protect.

- Coatings :
    - Apply in dry atmospheric conditions when primer is tacky. Allow to dry when used on bituminous surfaces.
    - Uniform, continuous coverage. Do not allow to pool in hollows.
    - Firmly adhered to substrate and free from imperfections.
    - Prevent damage to finished coatings.
- Penetrations : Impervious.

-Final covering : Apply as soon as possible after coating has hardened.

220 COLD APPLIED COATINGS

- Thinning : Not permitted unless recommended by manufacturer.
- Successive coats :
    - Allow to dry before applying next.
    - Apply at right angles to previous.

235 MODIFIED COATINGS

- Air and surface temperatures : Do not apply if below minimum recommended by coating manufacturer.
- Curing : Keep dry until fully cured.

COMPLETION

330 PROTECTION OF COATINGS

- Coated surface : Clean and free from contaminants.
- Board manufacturer :

RIW Limited, Arc House, Terrace Road South, Binfield, RG42 4PZ.

Tel : 01344 397777 Fax : 01344 862010

E-mail : technical@riw.co.uk Web : www.riw.co.uk

    - Product reference : RIW Double Drain
    - Thickness : 8mm.
- Placement : Immediately prior to covering. Provide support as necessary.
    - Edge overlap (minimum) : 70mm.

- Perimeter treatment : Seal with geotextile fabric to prevent silt entering the core.
- Contact : Secure. Full and continuous with coating.

OR

- Product reference : RIW Protection Board.
- Thickness : 3mm.
- Placement : Immediately prior to covering. Provide support as necessary.
- Edge overlap (minimum) : Not required.
- Perimeter treatment : Butt joint.
- Contact : Secure. Full and continuous with coating.

340 BACKFILLING

– Timing : Carry out as soon as possible after tanking and protection are complete.

–

J30 LIQUID APPLIED TANKING / DAMP PROOFING

To be read with Preliminaries / General conditions.

EXECUTION continued.

261 JUNCTIONS WITH STRUCTURESEAL

- Apply 300mm wide band of RIW Sheetseal 226, lapped 150mm onto RIW Structureseal, and 150mm onto adjacent structure.
- Seal together using 50 x 5mm bead of RIW Sealing Compound, in centre of lap.
- Apply RIW Flexiseal, lapped over the RIW Sheetseal 226, by 200mm minimum.
- Do not apply RIW Flexiseal Primer onto RIW Sheetseal 226

J40 FLEXIBLE SHEET TANKING / DAMP PROOFING

To be read with Preliminaries / General conditions.

110 HARDCORE BEDS

- Preparation: Blind with soft sand or pulverized fuel ash.
- Thickness (minimum): 150mm.
- Finish on completion: Smooth, consolidated bed free of sharp projections.

TYPES OF TANKING/ DAMP PROOFING

120 LOOSE LAID POLYETHYLENE DAMP PROOFING UDER FLOOR SLABS

- Substrate: Sand blinded hardcore.
- Manufacturer: Contractor's choice.
- Thickness/ Gauge: 1200 gauge.
- Joints:
- Surface to be joined: Clean and dry beyond full width of joint.
- Laps (minimum): 150mm side and end laps.
- Sealing: Edge of top sheet sealed with jointing tape.

TYPES OF TANKING / DAMP PROOFING

285 LOOSE LAID BENTONITE DAMP PROOFING / TANKING

- Substrate :
- Manufacturer : RIW Limited, Arc House, Terrace Road South, Binfield, RG42 4PZ.
  Tel : 01344 397777 Fax : 01344 862010
  E-mail : technical@riw.co.uk Web : www.riw.co.uk
  - Product reference : RIW Structureseal.
- Number of layers : One.
- Laying : Staggered joints.
  - Fixing to vertical / sloping surfaces : RIW Washers as required, to suit background.
  - Fixings for horizontal surfaces : RIW Staples at 400mm maximum centres.
- Joints : Minimum overlap ;100mm.
  - Sealing : Not required.
- Accessories : RIW Sealing Compound & RIW Granules.
  RIW Waterstop, as Specification E40, Clause 320.

WORKMANSHIP

310 WORKMANSHIP GENERALLY
- Condition of substrate :
  - Clean and even textured, free from voids and sharp protrusions.
  - Moisture content : Compatible with damp proofing / tanking.
- Air and surface temperature : Do not apply sheets if below minimum recommended by sheet manufacturer.
- Condition of membrane at completion :
  - Neat, smooth and fully supported, dressed well into abutments and around intrusions.
  - Completely impervious and continuous.
  - Undamaged. Prevent puncturing during following work.
- Permanent overlying construction : Cover membrane as soon as possible.

320 INSPECTION
- Give notice : Before covering any part of membrane with overlying construction.

360 JUNCTIONS WITH PROJECTING DPCS/ CAVITY TRAYS
- Adjoining surfaces: Clean and dry.
- Dpcs/ Cavity trays: Lap and fully bond/ seal with sheeting.
  - Laps (minimum): 150mm.
  - Bonding/ Sealing: Mastic tape.

365 JUNCTIONS WITH FLUSH DPCS/ CAVITY TRAYS
- Adjoining surfaces: Clean and dry.
- Dpcs/ Cavity trays:
  - Expose edge where concealed.
  - Lap and fully bond/ seal sheeting to wall.
  - Dressing of sheeting beyond dpc/ cavity tray (minimum): 50 mm.
  - Bonding/ Sealing: Mastic tape.

370 A PIPES, DUCTS, CABLES, ETC :
- Where these pass through sheeting, make junctions completely impervious using a 40 x 40mm fillet of RIW Sealing Compound, applied over the RIW Structureseal.

J40 FLEXIBLE SHEET TANKING / DAMP PROOF MEMBRANES

To be read with Preliminaries/General conditions.

110 HARDCORE BEDS: Blind with not less than 12mm of soft sand or pulverised fuel ash and consolidate to provide a smooth bed free of sharp projections.

120 POLYETHYLENE DAMP PROOF MEMBRANE:
- Manufacturer and reference: Visqueen
  Thickness/gauge: 1200g
- Lay sheets neatly and tuck well into angles to prevent bridging.
- Joint sheets with continuous strips of mastic between overlaps of not less than 150mm and seal with tape along the edge of the upper sheet, leaving no gaps. Ensure that sheets are clean and dry at time of jointing. Use mastic and tape recommended for the purpose by sheet manufacturer.
- If sheets cannot be kept dry, double welted joints may be used provided they are temporarily weighted to hold the folds in position prior to laying concrete.
- Form folded welts at corners in upstands.

K10 PLASTERBOARD DRY LININGS / PARTITIONS / CEILINGS

To be read with Preliminaries/General conditions.

TYPE(S) OF DRY LINING

245 CEILING LINING ON TIMBER GENERALLY
- Background: Timber joists at 400c/s, nogg as necessary
- Lining: Wall board 12.5mm
  Fixing: As clause 610, using 63mm nails
- Acoustic sealant: As clause 515.
- Finishing: skim finish

275 ENCASEMENT ON TIMBER FRAMING TO STEEL BEAMS.
- Timber framework: 50mm x 50mm C16 grade framing with noggings at maximum 400mm centres.
- Linings: 2 layers of 12.5mm thick Gyproc Fireline moisture resistant board.
  - Fixing: In accordance with the manufacturer's instructions.
- Finishing: Seamless jointing.
  - Primer/ Sealer: Not required.
  - Accessories:
- Other requirements: None.

INSTALLATION

335 ADDITIONAL SUPPORTS
- Framing: Accurately position and securely fix to give full support to:
  - Partition heads running parallel with, but offset from main structural supports.

- Fixtures, fittings and service outlets. Mark framing positions clearly and accurately on linings.
- Board edges and lining perimeters, as recommended by board manufacturer to suit type and performance of lining.

375 NEW WET LAID BASES

- Dpcs: Install under full width of partitions/ freestanding wall linings.
- Material: Bituminous sheet or plastics.

435 DRY LININGS GENERALLY

- General: Use fixing, jointing, sealing and finishing materials, components and installation methods recommended by board manufacturer.
- Cutting plasterboards: Neatly and accurately without damaging core or tearing paper facing.
- Cut edges: Minimize and position at internal angles wherever possible. Mask with bound edges of adjacent boards at external corners.
- Fixings boards: Securely and firmly to suitably prepared and accurately levelled backgrounds.
- Finishing: Neatly to give flush, smooth, flat surfaces free from bowing and abrupt changes of level.

445 CEILINGS

- Sequence: Fix boards to ceilings before installing dry lined walls and partitions.
- Orientation of boards: Fix with bound edges at right angles to supports and with ends staggered in adjacent rows.
- Two layer boarding: Stagger joints between layers.

505 INSTALLING MINERAL WOOL INSULATION

- Fitting insulation: Closely butted joints and no gaps. Use fasteners to prevent slumping or displacement.
- Services:
  - Electrical cables overlaid by insulation: Sized accordingly.
  - Ceilings: Cut insulation around electrical fittings, etc.

510 SEALING GAPS AND AIR PATHS

- Location of sealant: To perimeter abutments and around openings.
  - Pressurized shafts and ducts: At board-to-board and board-to-metal frame junctions.
- Application: To clean, dry and dust free surfaces as a continuous bead with no gaps.
  - Gaps greater than 6 mm between floor and underside of plasterboard: After sealing, fill with jointing compound.

560 JOINTS BETWEEN BOARDS

- Tapered edged plasterboards:
  - Bound edges: Lightly butted.
  - Cut/ unbound edges: 3 mm gap.
- Square edged plasterboards: 3 mm gap.
- Square edged fibre reinforced gypsum boards: 5 mm gap.

565 VERTICAL JOINTS

- Joints: Centre on studs.
  - Partitions: Stagger joints on opposite sides of studs.

- Two layer boarding: Stagger joints between layers.

570 HORIZONTAL JOINTS

- Surfaces exposed to view: Horizontal joints not permitted. Seek instructions where height of partition/ lining exceeds maximum available length of board.
- Two layer boarding: Stagger joints between layers by at least 600 mm.
- Edges of boards: Support using additional framing.
  - Two layer boarding: Support edges of outer layer.

580 INSULATION BACKED PLASTERBOARD

- General: Do not damage or cut away insulation to accommodate services.
- Installation at corners: Carefully cut back insulation or plasterboard as appropriate along edges of boards to give a continuous plasterboard face, with no gaps in insulation.

610 FIXING PLASTERBOARD TO TIMBER

- Fixing to timber: Securely at the following centres (maximum):
  - Nails: 150 mm.
  - Screws to partitions/ wall linings: 300 mm. Reduce to 200 mm at external angles.
  - Screws to ceilings: 230 mm.
- Position of nails/ screws from edges of boards (minimum):
  - Bound edges: 10 mm.
  - Cut/ unbound edges: 13 mm.
- Position of nails/ screws from edges of timber supports (minimum): 6 mm.

FINISHING

650 LEVEL OF DRY LINING ACROSS JOINTS

- Sudden irregularities: Not permitted.
- Joint deviations: Measure from faces of adjacent boards using methods and straightedges (450 mm long with feet/ pads) to BS 8212, clause 3.3.5.
  - Tapered edge joints:
    Permissible deviation (maximum) across joints when measured with feet resting on boards: 3 mm.
  - External angles:
    Permissible deviation (maximum) for both faces: 4 mm.
  - Internal angles:
    Permissible deviation (maximum) for both faces: 5 mm.

670 SEAMLESS JOINTING TO PLASTERBOARDS

- Cut edges of boards: Lightly sand to remove paper burrs.
- Filling and taping: Fill joints, gaps and internal angles with jointing compound and cover with continuous lengths of paper tape, fully bedded.
- Protection of edges/ corners: Reinforce external angles, stop ends, etc. with specified edge/ angle bead.
- Finishing: Apply jointing compound. Feather out each application beyond previous application to give a flush, smooth, seamless surface.
- Nail/ screw depressions: Fill with jointing compound to give a flush surface.
- Minor imperfections: Remove by light sanding.

680 SKIM COAT PLASTER FINISH

- Plaster type: Gypsum.
  - Thickness: 2-3 mm.

- Joints: Fill and tape except where coincident with metal beads.
- Finish: Tight, matt, smooth surface with no hollows, abrupt changes of level or trowel marks.

695 INSTALLING BEADS/ STOPS
- Cutting: Neatly using mitres at return angles.
- Fixing: Securely using longest possible lengths, plumb, square and true to line and level, ensuring full contact of wings with substrate.
- Finishing: After joint compounds/ plasters have been applied, remove surplus material while still wet from surfaces of beads exposed to view.

GENERALLY / PREPARATION

345 ADDITIONAL SUPPORTS FOR PARTITION HEADS: Provide or ensure provision of accurately positioned and securely fixed framing to receive partition heads running parallel with, but offset from main structural supports.

355 ADDITIONAL SUPPORTS FOR FIXTURES AND FITTINGS: Provide or ensure provision of accurately positioned and securely fixed framing to support fixtures, fittings and services. After fixing boards, mark positions of framing for following trades.

365 ADDITIONAL SUPPORTS FOR BOARD EDGES AND PERIMETERS:
Provide or ensure provision of additional framing, accurately positioned and securely fixed, to give full support to board edges and lining perimeters in accordance with board manufacturer's recommendations.

375 NEW WET LAID BASES: Provide or ensure provision of a continuous strip of bituminous felt dpc or other approved material under partitions/free standing wall linings, cut to the full width of the partition/lining.

405 PLASTERBOARD GENERALLY: To BS 1230:Part 1, types 1 to 5 with exposed surface and edge profiles suitable to receive the specified finish.

560 JOINTS BETWEEN BOARDS:
- Tapered edged plasterboards: Lightly butted. Leave a 3mm gap where cut/unbound edges occur.
- Square edged plasterboards to be finished with textured plastic compound: 3mm gap.
- Square edged fibre reinforced gypsum boards: 5mm gap.

565 VERTICAL JOINTS:
- Centre joints on studs. For partitions, ensure that joints on opposite sides of studs are staggered.
- For two layer boarding, stagger joints between layers.

610 FIXING PLASTERBOARD TO TIMBER SUPPORTS:
- Fix securely to all supports working from the centre of each board using the specified method of fixing at the following maximum centres:
Nails: 150mm centres.
Drywall screws: 300mm centres for partitions/wall linings (reduced to 200mm at external angles where recommended by the board manufacturer) and 230mm centres for ceilings.
- Position fixings not less than 10mm from bound edges, 13mm from cut/unbound edges and not less than 6mm from the edge of the timber support.

- Type and length of fixings as recommended in BS 8212, section 2.2.3, unless specified otherwise.

680 SKIM COAT PLASTER FINISH:
- Manufacturer and reference: Gyproc
  Thickness: 2-3mm.
- Fill and tape all joints except where coincident with metal beads.
- Trowel/float to a tight, matt, smooth surface with no hollows, abrupt changes of level or trowel marks.

K20 TIMBER BOARD FLOORING / SARKING / LININGS / CASINGS

TYPE(S) OF FLOORING / SARKING / LINING / CASING

110 TIMBER BOARD TO VARIOUS CASINGS
- Base: 50 x 50mm sw framing
- Boards: SEASONED SW 20 thick x 150mm wide square edge.

-Moisture content at time of fixing: Not exceeding 19%.
-Fixing: Secret nailed
-Jointing, glued tongue

370 FINISHING OAK FLOORING:
- Sand parquet flooring with an electric surfacing machine to give a clean, smooth surface free from lipping and score marks.
- Apply 2 coat(s) of OS WAX as M60

WORKMANSHIP

710 INSTALLATION GENERALLY:
- In the absence of manufacturers recommendations store, prepare and fix sheets in accordance with the recommendations of the relevant trade association.
- Keep sheets dry and do not fix to timber supports which have a moisture content greater than 18%.
- Do not fix sheets internally until the building is weathertight.
- Set out sheets with joints accurately aligned, of constant width and parallel to perimeter edges.
- Methods of fixing and fastenings to be as section Z20 unless specified otherwise.
- Protect sheets from dirt, stains and damage until Practical Completion.

730 ADDITIONAL SUPPORTS: Where specified ensure that studs, noggings or battens as specified in clause G20/770 and not less than 50 mm wide are provided as follows:
- Tongue and groove jointed rigid sheet areas: To all unsupported perimeter edges.
- Butt jointed rigid sheet areas: To all unsupported sheet edges.

780 ACCESS PANELS: Agree size and position with CA before sheets are fixed. Provide additional noggings, battens, etc., as necessary.

L20 DOORS / SHUTTERS / HATCHES

PRELIMINARY INFORMATION /REQUIREMENTS

To be read with Preliminaries/ General conditions.

GENERAL

110 EVIDENCE OF PERFORMANCE
- Certification: Provide independently certified evidence that all incorporated components comply with specified performance requirements.

115 FIRE RESISTING DOORS/ DOORSETS/ ASSEMBLIES
- Evidence of fire performance: Provide certified evidence, in the form of a product conformity certificate, directly relevant fire test report or engineering assessment, that each door/ doorset/ assembly supplied will comply with the specified requirements for fire resistance if tested to BS 476-22, BS EN 1634-1 or BS EN 1634-3. Such certification must cover door and frame materials, glass and glazing materials and their installation, essential and ancillary ironmongery, hinges and seals.

150 SITE DIMENSIONS must be taken and recorded on shop drawings before starting to make external doors and all to suit existing openings

COMPONENTS

270 EXTERNAL JOINERY: 44mm thick FD Hall & son
- Materials generally: To BS 1186:Part 1.
  Timber species: IROKO
- Joinery workmanship: As section Z10.
- Adhesive: WBP
- Accuracy: To BS 4787:Part 1
- Finish as delivered: natural

310 GENERAL TIMBER DOOR FRAMES/LININGS:
- Timber species: Eurporan joinery grade Oak approx. 32mm thick
- Finish as delivered: natural
- Fixing: frame fixings
-

INSTALLATION

710 PROTECTION OF COMPONENTS: Do not deliver to site components which cannot be put immediately into suitable dry, floored and covered storage. Stack on bearers, separated with spacers to prevent damage by and to projecting ironmongery, beads, etc.

720 MOISTURE CONTENT: During delivery, storage, fixing and thereafter to Practical Completion maintain conditions of temperature and humidity to suit specified moisture content(s) of timber components. When instructed by CA, test components with an approved electrical moisture meter used in accordance with manufacturer's recommendations.

730 PRIMING/SEALING: Before fixing components ensure that surfaces of timber which will be inaccessible after installation are primed or sealed as specified.

740 CORROSION PROTECTION: Before fixing, apply two coats of bitumen solution to BS 6949 or an approved mastic impregnated tape, to surfaces of components which will corrode when in contact with the adjacent surface.

760 BUILDING IN will not be permitted except where specifically stated.

790 FIXING CENTRES FOR TIMBER FRAMES: When not pre drilled or specified otherwise, position fixings 150mm from each end of jamb, adjacent to each hanging point and at 600mm maximum centres.

810 FIRE RESISTING FRAMES: Completely fill gap between frame and wall with intumescent putty

830 IRONMONGERY: Assemble and fix carefully and accurately using fastenings with matching finish supplied by ironmongery manufacturer. Prevent damage to ironmongery and adjacent surfaces. At completion check, adjust and lubricate as necessary to ensure correct functioning.

830 FIXING IRONMONGERY GENERALLY

- Fasteners: Supplied by ironmongery manufacturer.
- Finish/ Corrosion resistance: To match ironmongery.
- Holes for components: No larger than required for satisfactory fit/ operation.
- Adjacent surfaces: Undamaged.
- Moving parts: Adjusted, lubricated and functioning correctly at completion.

840 FIXING IRONMONGERY TO FIRE RESISTING DOOR ASSEMBLIES

- General: All items fixed in accordance with door leaf manufacturer's recommendations ensuring that integrity of the assembly, as established by testing, is not compromised.
- Holes for through fixings and components: Accurately cut.
- Clearances: Not more than 8 mm unless protected by intumescent paste or similar.
- Lock/ Latch cases for fire 120 doors requiring $\geq$ 120 minutes integrity performance: Coated with intumescent paint or paste before installation.

850 LOCATION OF HINGES TO ALUMINIUM DOORS.

As fabricated by manufacturer.

851 LOCATION OF HINGES TO DOORS OTHER THAN ALUMINIUM ONES.

- Primary hinges: Where not specified otherwise, positioned with centre lines 250 mm from top and bottom of door leaf.
- Third hinge: Where specified, positioned in centre of door leaf vertically.
- Hinges for fire resisting doors: Positioned in accordance with door leaf manufacturer's recommendations.

L30 STAIRS/ LADDERS/ WALKWAYS/ HANDRAILS/ BALUSTRADES

To be read with Preliminaries/ General conditions.

PRELIMINARY INFORMATION/ REQUIREMENTS

110 DESIGN

- Design standard: The following items have been designed to BS 5395 where applicable:Stairs, balustrades and handrails.
- Completion of design: Finalize details to meet structural and safety requirements of BS 5395.
- Type of activity/ occupancy category to BS 6399-1: D.

130 SITE DIMENSIONS

- Procedure: Before starting work on designated items take site dimensions, record on shop drawings and use to ensure accurate fabrication.

Designated items:
External staircases specified in following clause.
Total rise of staircases.

COMPONENTS

550 PURPOSE MADE BALUSTRADES

- Fabricator to design to suit imposed loadings and dimensional requirements. Galvanise after fabrication.
- Refer to drawings for member sizes and fabrication details.
- Component material, grade and finish as delivered:
  - Guarding: Galvanised steel.
  - Handrails: Galvanised steel, with timber handrail fixed to top as described iroko oiled.
- Workmanship:
  - Joinery: To Section Z10.
  - Metalwork: To Section Z11.
- Fixing: Refer to details.

INSTALLATION

610 MOISTURE CONTENT

- Temperature and humidity: Monitor and control internal conditions to achieve specified moisture content in wood components at time of installation.

620 PRIMING/ SEALING/ PAINTING

- Surfaces inaccessible after assembly /installation: Before fixing components, apply full protective/ decorative treatment/ coating system.

630 CORROSION PROTECTION OF DISSIMILAR MATERIALS

- Components/ substrates/ fasteners of dissimilar materials: Isolate using washers/ sleeves or other suitable means to separate materials to avoid corrosion and/ or staining.

640 INSTALLATION GENERALLY

- Fasteners and methods of fixing: To section Z20.
- Structural members: Do not modify, cut, notch or make holes in structural members, except as indicated on drawings.
- Temporary support: Do not use stairs, walkways or balustrades as temporary support or strutting for other work.

L40 GENERAL GLAZING

To be read with Preliminaries/General conditions.

150 WORKMANSHIP GENERALLY

- Glazing generally: To BS 6262.
- Integrity: Glazing must be wind and watertight under all conditions with full allowance made for deflections and other movements.
- Dimensional tolerances: Panes/ sheets to be within ± 2 mm of specified dimensions.
- Materials:
  - 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.
  - Protection: Keep materials dry until fixed. Protect insulating glass units and plastics glazing sheets from the sun and other heat sources.

152 PREPARATION

- Surrounds, rebates, grooves and beads: Clean and prepare before installing glazing.

155 GLASS GENERALLY

- Standards: To BS 952 and relevant parts of:
  - BS EN 572 for basic soda lime silicate glass.
  - BS EN 1096 for coated glass.
  - BS EN 1748-1-1 for borosilicate glass.
  - BS EN 1748-2-1 for ceramic glass.
  - BS EN 1863 for heat strengthened soda lime silicate glass.
  - BS EN 12150 for thermally toughened soda lime silicate safety glass
  - BS EN 12337 for chemically strengthened soda lime silicate glass.
  - BS EN 13024 for thermally toughened borosilicate safety glass.
  - BS EN ISO 12543 for laminated glass and laminated safety glass.
- Panes/ sheets: Clean and free from obvious scratches, bubbles, cracks, rippling, dimples and other defects.
  - 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.

371 BEAD FIXED INSULATING GLAZING TO WINDOWS/DOORS

- Pane material: Low E 6/16/6 k K glass external pane, toughened & laminated impact glass internally as per door & window schedule.
- Apply glazing section/strip/tape to rebate upstand in position recommended by the manufacturer.
- Locate insulating unit centrally in surround using setting and locations blocks.
- Apply second glazing section/tape to beads, Install beads using sufficient pressure to compress inner and outer sections/strips/tapes and fix securely.

-Ensure that drainage and ventilation holes are not obstructed.

372 REPLACEMENT GLASS
- Single glaze 6mm float, putty glazed with non ferrous sprigs.

150 WORKMANSHIP GENERALLY:
- Glazing generally: to BS 6262.
- The glazing must be wind and watertight under all conditions with full allowance made for deflections and other movements.
- Panes/sheets to be accurately sized, with clean, undisfigured surfaces and undamaged edges.
- Avoid contact between glazing panes/units and alkaline materials such as cement and lime.
- Keep materials dry until fixed. Keep insulating glass units and plastics glazing sheets protected from the sun and away from heat sources.
- Ensure that glass/plastics, surround materials, sealers primers and paints/clear finishes to be used together are compatible. Comply with glazing and sealant manufacturers' recommendations.

152 PREPARATION: Clean surrounds, rebates, grooves and beads, and prepare as specified before installing glazing.

155 GLASS: Generally to BS 952 and the relevant part(s) of BS EN 572, free from scratches, bubbles, cracks, rippling, dimples and other defects.

165 HEAT TOUGHENED GLASS to be fixed in the following locations must be subjected to a heat soaking regime. All panes must be heat soaked. Provide certified evidence of treatment.

175 EDGE TAPES TO INSULATING UNITS: Report to CA any damage to edge tapes. Obtain approval of proposed method of repair.

180 BEAD FIXING WITH PINS: Space pins evenly at not more that 150mm centres, and within 50mm of each corner. Punch pins just below the timber surface.

M10 CEMENT:SAND / CONCRETE SCREEDS / TOPPINGS

To be read with Preliminaries/General conditions.

TYPE(S) OF SCREED / TOPPING

110 CEMENT:SAND SCREED
- Base: concrete
- Construction: Bonded as clause 260.
  Minimum thickness at any point: 25mm.
  Maximum thickness at any point: 50mm.
- Mix:
  Cement: Portland to BS 12 or Portland blast furnace to BS 146, class 42.5.
  Sand: To BS 882, grading limit M, but with not more than 10% passing sieve size 150 micrometres.
  Proportions: 1:2½-3

Admixture: Water reducing to BS 5075:Part 1, dosage to manufacturer's recommendations.

260 FULLY BONDED CONSTRUCTION:

- Shortly before laying screed/topping completely remove mortar matrix from surface to expose coarse aggregate over entire area of hardened base using abrasive blasting or, for in situ slabs only, pneumatic scabbling. Remove all dust and debris and wash clean.
- Keep surface well wetted for several hours before laying screed/topping. Remove free water then brush in a slurry bonding coat of creamy consistency.

Slurry: cement

- As an alternative to wetting and slurrying, prepare, prime as necessary and apply a bonding agent to manufacturer's recommendations.

660 PROTECTION: Adequately protect screeds/toppings from damage and contamination by subsequent building operations.

M20 PLASTERED/ RENDERED/ ROUGHCAST COATING

To be read with Preliminaries/ General conditions.

TYPES OF COATING

110 CEMENT:LIME:SAND INTERNAL RENDER TO CONCRETE BLOCKWORK.

- Substrate: Concrete blockwork.
  - Preparation: None.
- Cement:lime:sand mortar:
  - Type: Contractor's choice.
  - Pigment: Not required.
- Undercoats:
  - Mix (cement:lime:sand): 1:1:6.
    Cement type: Portland.
  - Thickness (excluding dubbing out and keys): 8mm to 10mm.
- Final coat:
  - Mix (cement:lime:sand): 1:1:6.
    Cement type: Portland.
    Other requirements: None.
  - Thickness: 10mm.
  - Finish: Wood float.
- Accessories: Angle beads and stop beads.

112 CEMENT:LIME:SAND RENDER TO EXTERNAL SURFACES OF CONCRETE BLOCKWORK.

- Substrate: Dense concrete blockwaork.
  - Preparation: None.
- Cement:lime:sand mortar:
  - Type: Contractor's choice.
  - Pigment: Not required.
- Undercoats:
  - Mix (cement:lime:sand): 1:1:6.
    Cement type: Portland.
  - Thickness (excluding dubbing out and keys): 8mm to 10mm.
- Final coat:
  - Mix (cement:lime:sand): 1:1:6.
    Cement type: Portland.
    Other requirements: None.
  - Thickness: 10mm.
  - Finish: Smooth wood float finish.
- Accessories: Angle beads and stop beads

113 CEMENT:LIME:SAND RENDER TO EXTERNAL SURFACES OF EXPANDED METAL LATHING.

- Substrate: Stainless steel ribbed expanded metal lathing.
  - Preparation: None.
- Cement:lime:sand mortar:
  - Type: Contractor's choice.
  - Pigment: Not required.
- Undercoats: (2). First coat, 3mm – 6mm from face of lathing. Second coat, 6mm to10mm.

- Mix (cement:lime:sand): 1:1:6.
  Cement type: Portland.
- Thickness (excluding dubbing out and keys): 8mm to 10mm.

- Final coat:
  - Mix (cement:lime:sand): 1:1:6.
    Cement type: Portland.
    Other requirements: None.
  - Thickness: 10mm.
  - Finish: Smooth wood float finish.
- Accessories: Angle beads and stop beads

200 GYPSUM PLASTER ON CEMENT GAUGED UNDERCOATS TO CONCRETE BLOCKWORK WALLS INTERNALLY.

- Substrate: Concrete blockwork.
  - Preparation: Stipple key.
- Undercoats:
  - Mix: 1:5 cement / sand.
  - Thickness (excluding dubbing out and keys): 16mm maximum overall.
- Final coat: Gypsum plaster to BS EN 13279-1, class B.
  - Manufacturer: Contractor's choice.
  - Thickness: 2mm – 3mm.
  - Finish: Smooth steel trowelled.
- Accessories: Beads and stops.

280 GYPSUM PLASTER SKIM COAT ON PLASTERBOARD TO INTERNAL FACES OF EXTERNAL TIMBER STUD WALLS AND TO CEILINGS.

- Plasterboard: 12.5mm thick Duplex plasterboard.
  - Preparation: Bonding agent as recommended by plaster manufacturer.
- Plaster: Board finish/ finish plaster to BS EN 13279-1, class B.
  - Manufacturer: Contractor's choice.
  - Thickness: 5mm (in 2 coats).
  - Finish: Smooth steel trowelled.
- Accessories: Angle beads; stops.

281 GYPSUM PLASTER SKIM COAT ON PLASTERBOARD TO FACES OF INTERNAL STUD PARTITIONS.

- Plasterboard: 12.5mm thick plasterboard.
  - Preparation: Bonding agent as recommended by plaster manufacturer.
- Plaster: Board finish/ finish plaster to BS EN 13279-1, class B.
  - Manufacturer: Contractor's choice.
  - Thickness: 5mm (in 2 coats).
  - Finish: Smooth steel trowelled.
- Accessories: Angle beads; stops.

MATERIALS AND MAKING OF MORTAR

430 READY-TO-USE CEMENT GAUGED MORTARS

- Time and temperature limitations: Use within limits prescribed by mortar manufacturer.

- Retempering: Restore workability with water only within prescribed time limits.

438 CEMENTS FOR MORTARS

- Cement: To BS EN 197-1 and CE marked.
  - Types: Portland cement, CEM I.
    Portland slag cement, CEM II.
    Portland fly ash cement, CEM II.
  - Strength class: 32.5, 42.5 or 52.5.
- White cement: To BS EN 197-1 and CE marked.
  - Type: Portland cement, CEM I.
  - Strength class: 52.5.
- Sulfate resisting Portland cement: To BS 4027 and Kitemarked.
  - Strength class: 42.5.
- Masonry cement: To BS EN 998-1 and Kitemarked.

440 SAND FOR CEMENT GAUGED MORTARS

- Standard: To BS EN 13139.
  - Grading: 0/2 or 0/4 (CP or MP); category 2 fines.
- Colour and texture: Consistent. Obtain from one source.

443 LIME FOR CEMENT GAUGED MORTARS

- Standard: To BS EN 459-1.
  - Type: CL 90S.

445 PIGMENT FOR COLOURED MORTARS

- Standard: To BS EN 12878.

449 ADMIXTURES FOR CEMENT GAUGED MORTARS

- Suitable admixtures: Select from:
  - Air entraining (plasticizing) admixtures: To BS EN 934-2 and compatible with other mortar constituents.
  - Other admixtures: Submit proposals.
- Prohibited admixtures: Calcium chloride and any admixture containing calcium chloride.

478 HYDRAULIC LIME

- Standard: To BS EN 459-1.
  - Type: Natural hydraulic lime (NHL).

481 READY PREPARED LIME PUTTY

- Type: Slaked directly from CL 90 quicklime to BS EN 459-1, using an excess of water.
  - Maturation: In pits/ containers that allow excess water to drain away.
  - Density of matured lime putty: 1.3–1.4 kg/litre.
- Maturation period before use (minimum): 90 days.
- Storage: Prevent drying out or wetting. Protect from frost.

495 MIXING

- Render mortars (site-made):
  - Batching: By volume. Use clean and accurate gauge boxes or buckets.
  - Mix proportions: Based on damp sand. Adjust for dry sand.

- Lime:sand: Mix thoroughly. Allow to stand, without drying out, for at least 16 hours before using.
- Mixes: Of uniform consistence and free from lumps. Do not retemper or reconstitute mixes.
- Contamination: Prevent intermixing with other materials.

497 COLD WEATHER
- General: Do not use frozen materials or apply coatings on frozen or frost bound substrates.
- External work: Avoid when air temperature is at or below 5°C and falling or below 3°C and rising. Maintain temperature of work above freezing until coatings have fully hardened.
- Internal work: Take precautions to enable internal coating work to proceed without detriment when air temperature is below 3°C.

PREPARING SUBSTRATES

510 SUITABILITY OF SUBSTRATES
- Soundness: Free from loose areas and significant cracks and gaps.
- Cutting, chasing, making good, fixing of conduits and services outlets and the like: Completed.
- Tolerances: Permitting specified flatness/ regularity of finished coatings.
- Cleanliness: Free from dirt, dust, efflorescence and mould, and other contaminants incompatible with coatings.

541 BONDING AGENT APPLICATION
- General: Apply evenly to substrate to achieve effective bond of plaster/ render coat. Protect adjacent surfaces.

BACKINGS/ BEADS/ JOINTS

607 PROPRIETARY GYPSUM PLASTERBOARD BACKINGS
- Manufacturer: Contractor's choice.
- Exposed surface and edge profiles: Suitable to receive specified plaster finish.

610 FIXING PLASTERBOARD BACKINGS TO TIMBER
- Fixings, accessories and installation methods: As recommended by board manufacturer.
- Fixing: At the following centres (maximum):
  - Nails: 150 mm.
  - Screws to partitions/ walls: 300 mm. Reduce to 200 mm at external angles.
  - Screws to ceilings: 230 mm.
- Position of nails/ screws from edges of boards (minimum):
  - Bound edges: 10 mm.
  - Cut/ unbound edges: 13 mm.
- Position of nails/ screws from edges of supports (minimum): 6 mm.
- Nail/ screw heads: Set below surface. Do not break paper or gypsum core.

612 JOINTS IN PLASTERBOARD BACKINGS
- Ceilings:
  - Bound edges: At right angles to supports and with ends staggered in adjacent rows.

- Two layer boarding: Stagger joints between layers.

- Partitions/ walls:
  - Vertical joints: Centre on studs. Stagger joints on opposite sides of studs.
    Two layer boarding: Stagger joints between layers.
  - Horizontal joints:
    Two layer boarding: Stagger joints between layers by at least 600 mm. Support edges of outer layer.
- Joint widths (maximum): 3 mm.

630 BEADS/ STOPS FOR INTERNAL USE
- Material: Galvanized steel to BS 13658-1.

636 BEADS/ STOPS FOR EXTERNAL USE
- Material: Stainless steel.

640 BEADS/ STOPS GENERALLY
- Location: External angles and stop ends, except where specified otherwise.
- Corners: Neat mitres at return angles.
- Fixing: Secure, using longest possible lengths, plumb, square and true to line and level, ensuring full contact of wings with substrate.
  - Beads/ stops for external render: Fix mechanically.
- Finishing: After coatings have been applied remove surplus material, while still wet, from surfaces of beads/ stops exposed to view.

646 CRACK CONTROL AT JUNCTIONS BETWEEN DISSIMILAR SOLID SUBSTRATES
- Locations: Where defined movement joints are not required. Where dissimilar solid substrate materials are in same plane and rigidly bonded or tied together.
- Crack control materials:
  - Isolating layer: Building paper to BS 1521.

Metal lathing: Externally: Stainless steel ribbed expanded metal.
Internally: Galvanised steel expanded metal with spacers.
- Installation: Fix metal lathing over isolating layer. Stagger fixings along both edges of lathing.
- Width of installation over single junctions:
  - Isolating layer: 150 mm.
  - Lathing: 300 mm.
- Width of installation across face of dissimilar substrate material (column, beam, etc. with face width not greater than 450 mm):
  - Isolating layer: 25 mm (minimum) beyond junctions with adjacent substrate.
  - Lathing: 100 mm (minimum) beyond edges of isolating layer.

659 PLASTERBOARD JOINTS
- Joints and angles (except where coincident with metal beads): Reinforce with continuous lengths of jointing tape.

INTERNAL PLASTERING

710 APPLICATION GENERALLY
- Application of coatings: Firmly and in one continuous operation between angles and joints. Achieve good adhesion.

- Appearance of finished surfaces: Even and consistent. Free from rippling, hollows, ridges, cracks and crazing.
- Accuracy: Finish to a true plane, to correct line and level, with angles and corners to a right angle unless specified otherwise, and with walls and reveals plumb and square.
- Drying out: Prevent excessively rapid or localized drying out.

715 FLATNESS/ SURFACE REGULARITY
- Sudden irregularities: Not permitted.
- Deviation of plaster surface: Measure from underside of a straight edge placed anywhere on surface.
- Permissible deviation (maximum) for plaster not less than 13 mm thick: 3 mm in any consecutive length of 1800 mm.

720 DUBBING OUT
- General: Correct substrate inaccuracies.
- New smooth, dense concrete and similar surfaces: Dubbing out prohibited unless total plaster thickness is within range recommended by plaster manufacturer.
- Thickness of any one coat (maximum): 10 mm.
- Mix: As undercoat.
- Application: Achieve firm bond. Allow each coat to set sufficiently before the next is applied. Cross scratch surface of each coat.

725 UNDERCOATS GENERALLY
- General: Rule to an even surface. Cross scratch to provide a key for the next coat.
- Undercoats on metal lathing: Work well into interstices to obtain maximum key.
- Undercoats gauged with Portland cement: Do not apply next coat until drying shrinkage is substantially complete.

777 SMOOTH FINISH
- Appearance: A tight, matt, smooth surface with no hollows, abrupt changes of level or trowel marks. Avoid water brush, excessive trowelling and over polishing.

778 WOOD FLOAT FINISH
- Appearance: An even overall texture. Finish with a dry wood float as soon as wet sheen has disappeared.

M30 METAL LATHING/ ANCHORED MESH REINFORCEMENT FOR PLASTERED/ RENDERED COATINGS

To be read with Preliminaries/ General conditions.

TYPES OF LATH/ REINFORCEMENT

110 METAL LATH FOR EXTERNAL RENDER TO TIMBER FRAMED WALLS.
- Substrate: Vertical timber battens at 400mm centres.
- Lath: Stainless steel expanded ribbed lath; BS EN 13658 – 1 and – 2.
  - Grade: Not applicable.
  - Finish: Epoxy coated.
- Additional requirements: Corner lath.

PRODUCTS

215 METAL LATH

- Internal applications: Flat, corrugated and ribbed expanded lath to BS EN 13658-1.
- External applications: Flat, corrugated and ribbed expanded lath to BS EN 13658-2.
- Galvanized steel: To BS EN 10327 and BS EN 10143.
- Stainless steel: To BS EN 10088-1 and -2, number 1.4301 (name X5CrNi18-10).

285 FIXINGS

- Nails: 38 x 2 mm galvanized steel clout nails to BS 1202-1.
- Staples: 32 x 2 mm galvanized steel.

EXECUTION

420 FIXING RIBBED EXPANDED METAL LATH

- Requirement: Fixed securely to give a taut, firm base for plaster or render.
- Placement:
  - Orientation: Ribs at right angles to supports.
  - Apexes: Bearing on supports.
- Laps:
  - Side ribs: Lap, press well together.
  - Ends (minimum):

    50 mm at supports.
    100 mm between supports.
  - Angles and bends: Do not locate laps within 100 mm of angles or bends.
- Fixing:
  - Generally: Each rib.
  - Sides: 1.2 mm wire ties at 150 mm (maximum) centres.
  - Ends at supports: 1.6 mm wire ties at each pair of ribs.
  - Ends between supports: Two rows of 1.6 mm wire ties.

  Centres (maximum): 100 mm.

M40 STONE / CONCRETE / QUARRY / CERAMIC TILING / MOSAIC

TYPE(S) OF TILING

GENERALLY

210 SUITABILITY OF BACKGROUNDS/BASES: Before starting work ensure that backgrounds/bases:

- Are such as to permit specified flatness/regularity of finished surfaces, bearing in mind the permissible minimum and maximum thicknesses of the bedding material.
- Have been allowed to dry out by exposure to the air for not less than the following:

  Concrete slabs: 6 weeks.
  Concrete walls: 6 weeks.
  Brick/block walls: 6 weeks.

Cement:sand screeds: 3 weeks.
Rendering: 2 weeks.
Gypsum plaster: 4 weeks.

FIXING

510 FIXING GENERALLY:
- Check that there are no unintended colour/shade variations within the tiles for use in each area/room. Thoroughly mix variegated tiles.
- Check that adhesive is compatible with background/base. Use a primer where recommended by the adhesive manufacturer.
- Cut tiles neatly and accurately.
- Unless specified otherwise fix tiles so that there is adhesion over the whole of the background/base and tile backs.
- Before bedding material sets make adjustments necessary to give true, regular appearance to tiles and joints when viewed under final lighting conditions.
- Clean surplus bedding material from joints and face of tiles without disturbing tiles.

550 FLATNESS/REGULARITY OF TILING: Sudden irregularities not permitted. When checked with a 2m straight edge with 3mm feet at each end, placed anywhere on the surface, the straight-edge should not be obstructed by the tiles and no gap should be greater than 6mm.

560 LEVEL OF TILING ACROSS JOINTS:
Maximum deviation between tile or slab surfaces either side of a joint, including movement joints to be:
1mm for joints less than 6mm wide.
2mm for joints 6mm or greater in width.

651 THIN BED ADHESIVE - SOLID (WALLS): Apply floated coat of adhesive to dry background in areas of approximately 1 sq m and comb the surface with the recommended solid bed trowel. Apply thin even coat of adhesive to backs of dry tiles. Press tiles onto bedding with twisting/sliding action to give finished bed thickness of not more than 3mm.

GROUTING / COMPLETION

875 GROUTING:
- Grout tiles as soon as possible after bedding has set sufficiently to prevent disturbance of tiles.
- Ensure that joints are max. 5mm wide for floors & 2mm wide for walls (or the depth of the tile if less), and are free from dust and debris.
- Fill joints completely, tool to an approved profile, clean off surface and leave free from blemishes.
- Polish wall tiling with a dry cloth when joints are hard.

910 PROTECTION GENERALLY: Adequately protect and keep clean all completed areas. Clean off any droppings immediately.

M60 PAINTING / CLEAR FINISHING

COATING SYSTEMS

110 EMULSION PAINT TO INTERNAL PLASTERED SURFACES.
- Manufacturer: Dulux.
  - Product reference: Trade Supermatt.
- Surfaces: New internal skim plastered surfaces of walls and ceilings.
  - Preparation: As Clause 580 .
- Initial coats: 25% thinned coat.
  - Number of coats: One.
- Finishing coats: Full coats.
  - Number of coats: Two.

130 GLOSS PAINT TO INTERNAL JOINERY (SKIRTINGS, DOOR FRAMES, ARCHITRAVES, ETC) AND TO INTERNAL DOORS.
- Manufacturer: Contractor's choice.
- Surfaces: Primed timber / plywood as appropriate.
  - Preparation: As Clause 471.
- Undercoats: As recommended by manufacturer.
  - Number of coats: Two.
- Finishing coats: Gloss.
  - Number of coats: One.

131 GLOSS PAINT TO EXPOSED STEEL (EXCEPT TO AREAS TO BE TREATED WITH INTUMESCENT PAINT).
- Manufacturer: Contractor's choice.
- Surfaces: Primed steel.
  - Preparation: As Clause 500.
- Initial coats: None.
- Undercoats: As recommended by manufacturer.
  - Number of coats: Two.
- Finishing coats: Gloss.
  - Number of coats: One.

160 DECORATIVE WOODSTAIN / VARNISH / PRESERVATIVE TO EXTERNAL TIMBER FASCIAS, SOFFITS, DOORS, HANDRAILS, ETC.
- Manufacturer: Contractor's choice.
- Surfaces: Unprimed timber / plywood as appropriate.
  - Preparation: As Clause 481.
- Initial coats: None.
- Finishing coats: Timber stain, to shade as selected by client.
  - Number of coats: Two.

170 MASONRY COATING TO NEW WALL SURFACES EXTERNALLY.
- Manufacturer: Dulux.
  - Product reference: Weathershield.
- Surfaces: New rendered surfaces.
  - Preparation: As Clause 570.
- Initial coats: 25% thinned coat.
  - Number of coats: One.
- Finishing coats: Full coats.
  - Number of coats: Two.

GENERAL

210 COATING MATERIALS

- Manufacturers: Obtain materials from any of the following: Dulux.
- Selected manufacturers: Submit names before commencement of coating work.

215 HANDLING AND STORAGE

- Coating materials: Deliver in sealed containers, labelled clearly with brand name, type of material and manufacturer's batch number.
- Materials from more than one batch: Store separately. Allocate to distinct parts or areas of the work.

240 SURFACES NOT TO BE COATED

- Radiator valves and stop valves.

280 PROTECTION

- 'Wet paint' signs and barriers: Provide where necessary to protect other operatives and general public, and to prevent damage to freshly applied coatings.

PREPARATION

400 PREPARATION GENERALLY

- Standard: In accordance with BS 6150.
- Suspected existing hazardous materials: Prepare risk assessments and method statements covering operations, disposal of waste, containment, and reoccupation, and obtain approval before commencing work.
- Preparation materials: Types recommended by their manufacturers and the coating manufacturer for the situation and surfaces being prepared.
- Substrates: Sufficiently dry in depth to suit coating.
- Efflorescence salts: Remove.
- Dirt, grease and oil: Remove. Give notice if contamination of surfaces/ substrates has occurred.
- Surface irregularities: Remove.
- Joints, cracks, holes and other depressions: Fill flush with surface, provide smooth finish.
- Dust, particles and residues from preparation: Remove and dispose of safely.
- Water based stoppers and fillers:
    - Apply before priming unless recommended otherwise by manufacturer.
    - If applied after priming: Patch prime.
- Oil based stoppers and fillers: Apply after priming.
- Doors, opening windows and other moving parts:
    - Ease, if necessary, before coating.
    - Prime resulting bare areas.

420 FIXTURES AND FITTINGS

- Removal: Before commencing work remove: Grilles, cover plates and other surface mounted fixtures.
- Replacement: Refurbish as necessary, refit when coating is dry.

425 IRONMONGERY

- Removal: Before commencing work remove ironmongery from surfaces to be coated.
- Hinges: Do not remove.
- Replacement: Refurbish as necessary; refit when coating is dry.

471 PREPRIMED WOOD
- Areas of defective primer: Take back to barewood and reprime.

481 UNCOATED WOOD
- General: Provide smooth, even finish with arrises and moulding edges lightly rounded or eased.
- Heads of fasteners: Countersink sufficient to hold stoppers/ fillers.
- Resinous areas and knots: Apply two coats of knotting.

500 PREPRIMED STEEL
- Areas of defective primer, corrosion and loose scale: Take back to bare metal. Reprime as soon as possible.

511 GALVANIZED, SHERARDIZED AND ELECTROPLATED STEEL
- White rust: Remove.
- Pretreatment: Apply one of the following:
    - 'T wash'/ mordant solution to blacken whole surface.
    - Etching primer recommended by coating system manufacturer.

521 UNCOATED STEEL - MANUAL CLEANING
- Oil and grease: Remove.
- Corrosion, loose scale, welding slag and spatter: Remove.
- Residual rust: Treat with a proprietary removal solution.
- Primer: Apply as soon as possible.

570 UNCOATED MASONRY/ RENDERING
- Loose and flaking material: remove.

580 UNCOATED PLASTER
- Nibs, trowel marks and plaster splashes: Scrape off.
- Overtrowelled 'polished' areas: Key lightly.

590 UNCOATED PLASTERBOARD
- Depressions around fixings: Fill with stopper/ filler.

645 SEALING OF INTERNAL MOVEMENT JOINTS
- General: To junctions of walls and ceilings with architraves, skirtings and other trims.
- Sealant: Water based acrylic.
    - Manufacturer: Contractor's choice.
    - Preparation and application: As section Z22.

APPLICATION

711 COATING GENERALLY
- Application: In accordance with BS 6150, clause 9.
- Conditions: Maintain suitable temperature, humidity and air quality during application and drying.

- Surfaces: Clean and dry at time of application.
- Thinning and intermixing of coatings: Not permitted unless recommended by manufacturer.
- Overpainting: Do not paint over intumescent strips or silicone mastics.
- Priming coats:
    - Thickness: To suit surface porosity.
    - Application: As soon as possible on same day as preparation is completed.
- Finish:
    - Even, smooth and of uniform colour.
    - Free from brush marks, sags, runs and other defects.
    - Cut in neatly.
- Doors, opening windows and other moving parts: Ease before coating and between coats.

730 WORKSHOP COATING OF CONCEALED JOINERY SURFACES
- General: Apply coatings to all surfaces of components.

731 SITE COATING OF CONCEALED JOINERY SURFACES
- General: After priming, apply additional coatings to surfaces that will be concealed when fixed in place.
    - Components: External door frames.
    - Additional coatings: One undercoat.

751 STAINING WOOD
- Primer: Apply, if recommended by stain manufacturer.
- Application: Apply in flowing coats and brush out excess stain to produce uniform appearance.

770 EXTERNAL DOORS
- Bottom edges: Prime and coat before hanging doors.

M61 INTUMESCENT COATINGS FOR FIRE PROTECTION OF STEELWORK

To be read with Preliminaries/ General conditions.

PROTECTIVE COATING SYSTEMS

110 ON SITE COATING TO PRIMED STEEL
- Use/ Location: To columns, beams, ties, etc on first floor tea rooms where left exposed to view and other locations where shown on drawings.
- Fire resistance to BS 476-21: 60 minutes.
- Preparation and priming: By steelwork contractor, as section G10.
- Intumescent coat:
    - Manufacturer: Quelfire.
    Product reference: “Quelcote GW” intumescent.
    - Finish: High decorative finish as per clause 460.
- Top sealer coat: Type recommended by intumescent coating manufacturer.
    - Dry film thickness: As recommended by manufacturer.
    - Colour: To be decided.
- Bolt head/ Nut protection: As main steelwork.

GENERAL REQUIREMENTS

205 VALIDATION OF MATERIALS

- Project specific evaluation of intumescent coating materials:
  - Standard: To BS 8202-2, clause 4.
  - Test results: Submit on request.

210 WORKING PROCEDURES

- Standard: To BS 8202-2.
- Give notice: Before commencing surface preparation and coating application.
- Quality control: Record project specific procedures for surface preparation and coating application.

215 WORKING CONDITIONS

- General: Maintain suitable temperature, humidity and air quality during coating application and drying.
- Surfaces to be coated: Clean and dry at time of coating application.

250 SPRAYED COATING APPLICATION

- Spray drift: Minimize.
- Masking: Protect designated adjacent surfaces.
  - Designated surfaces: Aluminium window and door frames.

270 INSPECTION

- Permit intumescent coating manufacturer to:
  - Inspect work in progress.
  - Inspect quality control records.
  - Take dry film thickness and other measurements.
  - Take samples of coating products.
- Intumescent coating manufacturer's inspection reports: Submit without delay.

APPLICATION OF COATINGS

410 INTUMESCENT DRY FILM THICKNESS (DFT)

- Required dft: Determine for every steel member to give specified period of fire resistance. Use intumescent coating manufacturer's current published loading tables.
  - Special sections and partial fire exposure conditions: Obtain required dft in writing from manufacturer.
- Schedule and drawings: Submit at least two weeks before starting work.
  - Schedule content: Member sizes, weights/ thicknesses, loading conditions, etc. showing, for each variant, the exposed perimeter/ sectional area (Hp/A) ratio and required dft.
  - Drawing content: Steelwork drawings marked in colour to show required dft for each member.

420 MEASUREMENT OF INTUMESCENT DFT

- Primer dft: Determine average dft (for deduction from total dft after application of intumescent).
- Intumescent dft: Determine at:
  - 500 mm centres along each coated plane of universal sections (8 planes), and rectangular hollow sections (4 planes).
  - 125 mm centres along coated circular hollow sections, spread evenly around circumference.

- Acceptance standard:
  - Average intumescent dft: Not less than required dft (exclusive of primer and top sealer).
  - Local intumescent dft: Not less than 80% of required dft. Areas greater than 100 mm equivalent diameter with a dft of less than 80% of required dft must be brought up to thickness.

440 BASIC FINISH
- Definition: Reasonably smooth and even. Orange peel, other texture, minor runs and similar minor defects are acceptable.

450 NORMAL DECORATIVE FINISH
- Definition: Good standard of cosmetic finish generally, when viewed from a distance of 5 m or more. Minor orange peel or other texture is acceptable.

460 HIGH DECORATIVE FINISH
- Definition: High standard of evenness, smoothness and gloss when viewed from a minimum distance of 2 m.

490 TOP SEALER COAT
- Application: To achieve dft recommended by manufacturer and to give an even, solid, opaque appearance, free from runs, sags and other visual defects.

530 RECORDS OF COATED STEEL
- On completion of intumescent coating work, submit:
  - Accurate surface preparation and coating application records.
  - Fire resistance certificates.
  - Intumescent coating manufacturer's recommendations for maintenance and overcoating.

GENERALLY

COLOURS: ALLOW FOR VARIOUS COLOURS SELECTED BY EMPLOYER

300 EXTERIOR PAINTING

302 ALL EXTERIOR JOINERY
System: Sikkens BL primer/undercoat 2cts 2 cts Rubbol BL Satura topcoat satin.

303 CAST IRON AND OTHER IRON WORK
Grit blast existing, mechanically wire brush new, two full coats zinc phosphate primer using different colours, one coat Dulux Trade undercoat and one coat Trade gloss.

INTERIOR

351 CEILINGS
- ICI Dulux Trade Eggshell.
- Preparation: 25% thinned coat.
- Making good: Stop in using angled lighting to achieve smooth surface.
- Finish: Two full coats.

352 LIME PLASTER WALLS
- KEIM or BEECK mineral paint
- Preparation: 25% thinned coat.
- Making good: Stop in using angled lighting to achieve smooth surface.
- Finish: Two full coats.

400 PREPARATION GENERALLY:
- Comply with BS 8000:Part 12, Section 2 and additional requirements in this specification.
- When removing or partially removing coatings, use methods which will not damage the substrate or adjacent surfaces or adversely affect subsequent coatings.
- Materials used in preparation to be types recommended by their manufacturers and the coating manufacturer for the situation and surfaces being prepared.
- Apply oil based stoppers/fillers after priming. Apply water based stoppers/fillers before priming unless recommended otherwise by manufacturer. Patch prime water based stoppers/fillers when applied after priming.
- Ensure that doors and opening windows, etc., are 'eased' as necessary before coating. Prime any resulting bare areas.

410 SUITABILITY OF SURFACES AND CONDITIONS: Application of coatings will be taken as joint acceptance by the Main Contractor and Subcontractor of the suitability of surfaces and conditions within any given area to receive the specified coatings.

420 FIXTURES: Before commencing work, remove all necessary fixtures and fittings, set aside and replace on completion:

460 STEEL - MANUAL CLEANING: In addition to general preparation and at an appropriate stage, remove residual rust with suitable chemical treatment, applying primer or patch primer as soon as it has cured.

750 COMPLETION: Ensure that opening lights and other moving parts move freely. Remove all masking tape and temporary coverings.

Polyx®-Oil Original High Solid 3032 satin-matt and 3062 matt clear interior wood finish
Product description: Clear, satin-matt (3032) or matt wood finish (3062), which combines all the advantages of oils and waxes in one unique product. Osmo Polyx®-Oil is resistant to water and dirt, is very durable and smoothens wood surfaces. In comparison to conventional finishes, the natural vegetable oils and waxes allow for an even colouring and a harmonic, smooth surface result. Easy application – no need for a primer or sanding between coats – saves time and money. It meets the wood's natural demands: It is microporous and does not crack, flake, peel or blister. Resistant against wine, beer, cola, coffee, tea, fruit juice, milk and water in accordance with DIN 68861-1A (German industrial norm). When dry, the finish is safe for humans, animals and plants (suitable for children's toys as per. EN 71.3 (European norm) and fast to perspiration and saliva in accordance with. DIN 53160 (German industrial norm)).
Recommended use: Ideal for all wooden floors, solid or plank wood, strip parquet, OSB or cork flooring. Highly recommended for wooden furniture. Also for slate and screed as well as terracotta and other natural (non-glazed) ceramic tiles.
Colour tone: Nr. 3032 Clear, satin-matt Nr. 3062 Clear, matt
Can sizes: 0.375 l, 0.75 l, 2.5 l, 10 l, 25 l
Coverage: 1 L = approx. 24 m2 Do you have greyed or split wood, an old unknown brand finish or an old Osmo finish on the surface, smooth or sanded wood, grooved, planed or rough sawn wood and would like to know how much finish is required to treat the wood? You can find more information on the individual usage calculation under www.osmo.com coverage calculator.

Ingredients: Based on natural vegetable oils and waxes (sunflower-oil, soyabean-oil, thistle-oil, carnauba-wax, candelilla-wax), paraffine, siccatives (drying agents) and additives. Disaromatised white spirit (benzene-free). This product fulfils EU-Regulation (2004/42/EC) according to the VOC limit value of max. 500 g/l (Cat. A/e (2010).
Detailed declaration of ingredients available upon request
Technical data:
Specific gravity: 0,88-0,95 g/cm3 Viscosity: 140-180 mPas Odour: low/mild, odourless after drying Flashpoint: ≥ 60°C according to DIN 53213
Storage: Shelf life is 5 years or more if can is tightly closed. Store in a dry place. If thickened by frost it will regain a normal consistency under normal temperatures within 24-36 hours.

N10 GENERAL FIXTURES / FURNISHINGS / EQUIPMENT

To be read with Preliminaries/General conditions.

COMPONENTS

N10 GENERAL FIXTURES / FURNISHINGS / EQUIPMENT

COMPONENTS

150 KITCHEN UNITS: Supplied by others
Allow for attendance
Provide all services thereto as schedules

N13 SANITARY APPLIANCES / FITTINGS

APPLIANCE / FITTING

WORKMANSHIP

410 INSTALLATION GENERALLY:
- Assemble and fix appliances and accessories so that surfaces designed to falls, drain as intended.
- Use non ferrous or stainless steel fastenings unless specified otherwise.
- When not specified otherwise, use jointing and bedding compounds recommended by the manufacturers of the appliances, accessories and pipes being jointed or bedded.
- Prevent use of appliances for any purpose until Practical Completion.
- On completion, check for damage and defects and test for satisfactory operation. Replace damaged or defective components and accessories. Clean thoroughly.

420 NOGGINGS/BEARERS: Ensure that noggings, bearers, etc. required to support sanitary appliances and fittings are accurately positioned and securely fixed.

430 TILED BACKGROUNDS (other than splash backs): Ensure that:
- Tiling is complete before fixing appliances.
- Fixings do not overstress tiles.

470 CISTERNS:

- Unless specified otherwise obtain cistern operating components from cistern manufacturer. Ensure that ball valve matches pressure of water supply.
- Fix at the height recommended by manufacturer unless otherwise specified or shown on drawings.
- Ensure that overflow pipe is fixed to falls, and located to give visible warning of discharge. Agree position with CA where not shown on drawings.

510 TAPS: Fix securely, making a watertight seal with the appliance. Place hot tap to left of cold tap as viewed by user of appliance.

520 WASTES/OVERFLOWS: Bed in waterproof jointing compound and fix with resilient washer between appliance and back nut.

550 SEALANT POINTING:
- Sealant: silicone based to BS 5889, Type B with fungicide. Manufacturer and reference: contractors choice
  Colour: white
- Application: As section Z22.

EXECUTION

610 INSTALLATION GENERALLY
- Assembly and fixing: Surfaces designed to falls to drain as intended.
- Fasteners: Nonferrous or stainless steel.
- Supply and discharge pipework: Fix before appliances.
- Fixing: Fix appliances securely to structure. Do not support on pipework.
- Jointing and bedding compounds: Recommended by manufacturers of appliances, accessories and pipes being jointed or bedded.
- Appliances: Do not use. Do not stand on appliances.
- On completion: Components and accessories working correctly with no leaks.
- Labels and stickers: Removed.

620 NOGGINGS AND BEARERS
- Noggings, bearers, etc. to support sanitary appliances and fittings: Position accurately. Fix securely.

630 TILED BACKGROUNDS OTHER THAN SPLASHBACKS
- Timing: Complete before fixing appliances.
- Fixing appliances: Do not overstress tiles.

660 INSTALLING SLAB URINALS
- Waterproofing of walls and floor (specified elsewhere): Completed before fixing urinal components.
- Gap between components: 3 mm.
- Space behind channels and slabs: Grout with 1:5 cement:sand grout.
- Pointing: Rake out joints to 10 mm depth. Point flush with waterproof jointing compound recommended by urinal manufacturer.

670 INSTALLING CISTERNS
- Cistern operating components: Obtain from cistern manufacturer.
  - Float operated valve: Matched to pressure of water supply.

- Overflow pipe: Fixed to falls and located to give visible warning of discharge.
  - Location: Agreed, where not shown on drawings.

710 INSTALLING TAPS
- Fixing: Secure against twisting.
- Seal with appliance: Watertight.
- Positioning: Hot tap to left of cold tap as viewed by user of appliance.

720 INSTALLING WASTES AND OVERFLOWS
- Bedding: Waterproof jointing compound.
- Fixing: With resilient washer between appliance and backnut.

P10 SUNDRY INSULATION / PROOFING WORK / FIRE STOPS

130 INSULATION FIXED TO EXISTING ROOF:
- Xtratherm thin R
- Thickness: 25mm between rafters, 100mm under rafters in continuous layer
- Fit tightly with closely butted joints, leaving no gaps. Use fastenings where necessary to prevent slumping.
- Before fixing, ensure that holes in the ceiling for pipes, lighting drops, etc. are sealed and all debris has been removed.
- Use widest practical widths of insulation and lay at right angles to ties/joists with closely butted joints, leaving no gaps.

440 FIRE STOPPING: Ensure that any imperfections of fit between building elements which are required to have fire resistance and/or resist the passage of smoke, are completely sealed. Where not specified otherwise, tightly pack gaps with mineral fibre.

P12 FIRE STOPPING SYSTEMS

To be read with Preliminaries/ General conditions.

GENERAL

130 FIRE STOPPING TO PIPES PASSING THROUGH FIRE RESISTING WALLS AND FLOORS.
- Joint filler: Pipe collars.
  - Size or thickness: To achieve 2 hours fire resistance.
  - Pipe outside diameter: Varies.

PRODUCTS

375 PIPE COLLARS – INSULATED WRAP
- Manufacturer: Rockwool.
  - Product reference: Fire Pro Intumescent Pipe Wraps.

EXECUTION

620 WORKMANSHIP GENERALLY

- Gaps: Seal gaps between building elements and services, to provide fire resistance and resist the passage of smoke.
- Adjacent surfaces: Prevent overrun of sealant or mortar on to finished surfaces.

690 FIXING PIPE COLLARS
- Collar fixing: Self adhesive strips. Seal pipe wrap into the structure with Rockwool Corofil Firestop Compound.
- Gap around collar: As per the manufacturer's recommendations.

COMPLETION

910 CLEANING
- Masking tapes: Remove.
- Cleaning: Clean off splashes and droppings. Wipe down finishes.

920 INSPECTION
Notice for inspection (minimum): 2 days.

P20 UNFRAMED ISOLATED TRIMS / SKIRTINGS / SUNDRY ITEMS

To be read with Preliminaries/General conditions.

110 SKIRTINGS TO MATCH EXISTING
- Quality of timber and fixing: To BS 1186:Part 3.
  Species: appendix B
  Class: 2 or 3
  Moisture content at time of fixing: 10 to 14 %

111 SOFTWOOD WINDOW BOARDS GENERALLY.
- Quality of wood and fixing: To BS 1186-3.
  - Species: Contractor's choice.
  - Class: 1.
- Moisture content at time of fixing: 8 – 12%.
- Preservative treatment: Organic solvent.
- Fire rating: Not applicable.
- Profile: Rounded at outer edges.
  - Finished size: As shown on drawings.
- Finish as delivered: Prepared and primed.
- Fixing: Nailed to treated timber battens / studwork as appropriate.

112 SOFTWOOD ARCHITRAVES GENERALLY.
- Quality of wood and fixing: To BS 1186-3.
  - Species: Contractor's choice.
  - Class: 1.
- Moisture content at time of fixing: 8 – 12%.
- Preservative treatment: Organic solvent.
- Fire rating: Not applicable.
- Profile: Bullnose.
  - Finished size: 44 x 12
- Finish as delivered: Prepared and primed.
- Fixing: Nailed to treated timber linings / door frames.

510 INSTALLATION GENERALLY:
- Joinery workmanship to be as section Z10 unless specified otherwise.
- Methods of fixing and fastenings to be as section Z20 unless specified otherwise.
- Straight runs to be formed in single lengths wherever possible. Location and method of forming running joints to be approved by the CA where not detailed.
- All joints at angles to be mitred unless specified otherwise.
- Moisture content of timber and wood based boards to be maintained during storage and installation within the range specified for the component.

P21 IRONMONGERY

To be read with Preliminaries/General conditions.

GENERALLY

110 GENERAL REQUIREMENTS:
Detailed requirements and locations of ironmongery are scheduled.

P30 TRENCHES / PIPEWAYS / PITS FOR BURIED ENGINEERING SERVICES

To be read with Preliminaries/General conditions.

GENERALLY

110 ROUTES OF SERVICES BELOW GROUND:
- Agree precise locations of service runs and pipe ducts with the CA.
- Set out clearly and accurately.

EXCAVATING / BACKFILLING

130 TRENCHES:
- Width to be as small as practicable with sides vertical.
- Remove mud, rock projections, boulders and hard spots from trench bottom and trim level.
- Inform CA in advance to give him reasonable opportunity to inspect trench for each section of the work.

140 BACKFILLING GENERALLY: Unless specified otherwise, use material excavated from the trench, laid and well compacted in layers not exceeding 300 mm thick. Do not use heavy compactors before there is 600 mm depth of backfill.

185 WARNING MARKER TAPES:
- During backfilling, lay continuous colour coded, heavy gauge polyethylene identification tapes along the route of gas main
- Location, depth, colour and markings to the requirements of the service undertaker.

PIPEDUCTS TO SERVICE ENTRIES

220 LAYING PIPEDUCTS:

- Lay pipes straight to line, true to gradient or level on an even, continuous 50 mm bed of the specified bedding material, laid over full width of trench. Provide 50 mm minimum clearance between pipe ducts where they cross.
- Where draw lines are required by the service installer, thread through each pipe during laying. Material, strength and length of draw line to be as specified by the service installer.
- Protect from damage and ingress of debris; temporarily seal all exposed ends during construction.
- Give service undertakers or subcontractors reasonable opportunity to inspect installation prior to backfilling.
- Lay and compact further bedding material to a level not less than 150 mm above crown of pipe.

231 BEDDING FOR PIPEDUCTS: Single size 10 mm aggregate to BS 882. Lay and compact uniformly in 100 mm layers.

P31 HOLES / CHASES / COVERS / SUPPORTS FOR SERVICES

To be read with Preliminaries/General conditions.

PRODUCTS

300 FLOOR DUCTING/ TRUNKING

- Obtain detailed requirements from subcontractor allow for & provide.

370 ACCESS COVERS/ GRATINGS

- Obtain detailed requirements from subcontractor allow for & provide.

400 METER CABINETS

- Obtain detailed requirements from subcontractor allow for & provide.

EXECUTION

610 COORDINATION

Locations and dimensions of holes and chases for services: Submit details.

620 HOLES AND CHASES IN IN SITU CONCRETE

- Cast in: Holes larger than 10 mm diameter and chases.
- Cutting and drilling:
  - Permitted for holes not larger than 10 mm diameter.
  - Not permitted for holes larger than 10 mm diameter except as indicated on drawings.

640 HOLES IN STRUCTURAL STEELWORK

- Cutting and drilling: Not permitted except as indicated on drawings.

650 HOLES, RECESSES AND CHASES IN MASONRY

- Locations: To maintain integrity of strength, stability and sound resistance of construction.
- Sizes: Minimum needed to accommodate services.
    - Holes (maximum): 300 x 300 mm.
- Walls of other materials:
    - Vertical chases: No deeper than one third of single leaf thickness, excluding finishes.
    - Horizontal or raking chases: No longer than 1 m. No deeper than one sixth of the single leaf thickness, excluding finishes.
- Chases and recesses: Do not set back to back. Offset by a clear distance at least equal to the wall thickness.
- Cutting: Do not cut until mortar is fully set. Cut carefully and neatly. Avoid spalling, cracking and other damage to surrounding structure.

670 NOTCHES AND HOLES IN STRUCTURAL TIMBER

- General: Avoid if possible.
- Sizes: Minimum needed to accommodate services.
- Position: Do not locate near knots or other defects.
- Notches and holes in same joist: Minimum 100 mm apart horizontally.
- Notches in joists: Locate at top. Form by sawing down to a drilled hole.
    - Depth (maximum): 0.125 x joist depth.
    - Distance from supports: Between 0.07 and 0.25 x span.
- Holes in joists: Locate on neutral axis.
    - Diameter (maximum): 0.25 x joist depth.
    - Centres (minimum): 3 x diameter of largest hole.
    - Distance from supports: Between 0.25 and 0.4 of span.
- Notches in roof rafters, struts and truss members: Not permitted.
- Holes in struts and columns: Locate on neutral axis.
    - Diameter (maximum): 0.25 x minimum width of member.
    - Centres (minimum): 3 x diameter of largest hole.
    - Distance from ends: Between 0.25 and 0.4 of span.

230 NOTCHES AND HOLES IN STRUCTURAL TIMBER:

- To be avoided wherever possible and to be the minimum sizes needed to accommodate services.
- Do not position near knots or other defects in the same cross section which would significantly affect strength of timber.
- Notches and holes in the same joist to be at least 100mm apart horizontally.
- Notches in joists to be at the top, located between 0.07 and 0.25 of span from support, not deeper than 0.125 x depth of joist and to be formed by sawing down to a drilled hole.
- Holes in joists to be on the neutral axis, with diameter not more than 0.25 x depth of joist, spaced at centres not less than 3 x diameter of largest hole and located between 0.25 and 0.4 of span from support.
- Notches in roof rafters, struts and columns will not be permitted.
- Holes in struts and columns to be on the neutral axis, with diameters not exceeding 0.25 x minimum width of member, located between 0.25 and 0.4 of length from end and spaced at centres not less than 3 x diameter of largest hole.

R11 FOUL DRAINAGE ABOVE GROUND

To be read with Preliminaries/General conditions.

TYPE(S) OF PIPEWORK

110 PVC-U PIPEWORK FOR SOIL SYSTEMS
- Pipes, fittings and accessories: PVC-U to BS 4514, Kite mark certified.
  Manufacturer and reference: Terrain or equal
  Nominal size(s): 110 mm.
  Colour: grey
  Accessories: Fire sleeves where pipes pass through floors
- Method of jointing: solvent welded
- Method of fixing: galvanised steel clips

120 PLASTICS PIPEWORK FOR WASTES
- Pipes, fittings and accessories: MUPVC to BS 5255, Kite mark certified.
  Manufacturer and reference: Terrain or equal
  Size(s): DN 32 & 40mm
  Colour: white
- Accessories: access eyes
- Method of jointing: solvent
- Method of fixing: plastic clips

INSTALLATION

520 INSTALLATION GENERALLY:
- Before commencing work specified in this section, ensure that any specified painting of surfaces which will be concealed or inaccessible is completed.
- Install pipes, fittings and accessories in accordance with BS 5572.
- Obtain all components for each type of pipework from the same manufacturer unless specified otherwise.
- Provide access fittings and rodding eyes as necessary in convenient locations to permit adequate cleaning and testing of pipework.
- Avoid contact between dissimilar metals and other materials which would result in electrolytic corrosion.
- Do not bend plastics or galvanized steel pipes.
- Adequately protect pipework from damage and distortion during construction. Fit purpose made temporary caps to prevent ingress of debris. Fit all access covers, cleaning eyes and blanking plates as the work proceeds.
- Where not specified otherwise use plated, sherardized, galvanized or non ferrous fastenings, suitable for the purpose and background, and compatible with the material being fixed.

530 BUILDERS WORK: Restrictions on the cutting of holes, chases,notches, etc., installation of pipe sleeves and stopping are specified in section P31.

540 PIPE ROUTES to be the shortest practical, with as few bends as possible and no bends in wet portion of soil stacks, unless specified otherwise. Pipe routes not shown on drawings to be approved before commencing work.

550 FIXING PIPEWORK:

- Fix securely at specified centres plumb and/or true to line.
- Make changes in direction of pipe runs only where shown on drawings unless otherwise approved.
- Fix branches and low gradient sections with uniform and adequate falls to drain efficiently.
- Fix externally socketed pipes/fittings with sockets facing upstream.
- Provide additional supports as necessary to support junctions and changes in direction.
- Fix every length of pipe at or close below the socket collar or coupling.
- Provide a load bearing support for vertical pipes at not less than every storey level. Tighten fixings as the work proceeds so that every storey is self supporting and undue weight is not imposed on fixings at the base of the pipe.
- Isolate from structure where passing through walls or floors and sleeve pipes as specified in section P31.
- Provide for thermal and building movement when fixing and jointing, and ensure that clearances are not reduced as fixing proceeds.
- Fix expansion joint pipe sockets rigidly to the building; elsewhere use fixings that allow the pipe to slide.

560 JOINTING PIPEWORK:
- Joint using materials, fittings and techniques that will make effective and durable connections.
- Joint differing pipework systems with adaptors recommended by manufacturer(s).
- Cut ends of pipes to be clean and square with burrs and swarf removed. Chamfer pipe ends before inserting into ring seal sockets.
- Ensure that jointing or mating surfaces are clean, and where necessary lubricated, immediately before assembly.
- Form junctions using fittings intended for the purpose ensuring that jointing material does not project into bore of pipes, fittings and appliances.
- Remove surplus flux/solvent/cement/sealant from joints.

710 ELECTRICAL CONTINUITY: Use clips supplied for the purpose by pipework manufacturer to ensure electrical continuity at all joints in metal pipes with flexible couplings and which are to be earth bonded.

740 AIR ADMITTANCE VALVES: Agrément certified.
- Install in a vertical position, above the flood level of the highest appliance served, and so that insulation materials (other than the manufacturers insulating cover) are kept clear of the valve body.
- Fit using a ring seal connection, or in such a way that the valve can easily be removed to allow the discharge stack to be rodded.
- Fit the manufacturers insulating cover in roof spaces and other unheated locations.

820 PIPEWORK TEST:
- Temporarily seal open ends of pipework with plugs.
- Connect a U tube water gauge and air pump to the pipework via a plug or through the trap of an appliance.
- Pump air into pipework until gauge registers 38 mm.
- Allow a period for temperature stabilisation, after which the pressure of 38 mm is to be maintained without loss for not less than 3 minutes.
-

EXECUTION

601 INSTALLATION GENERALLY

- Standard: To BS EN 12056-5.
- Components: From the same manufacturer for each type of pipework.
- Electrolytic corrosion: Avoid contact between dissimilar metals where corrosion may occur.
- Plastics and galvanized steel pipes: Do not bend.
- Allowance for thermal and building movement: Provide and maintain clearance as fixing and jointing proceeds.
- Concealed or inaccessible surfaces: Decorate before starting work specified in this section.
- Protection:
    - Purpose made temporary caps: Fit to prevent ingress of debris.
    - Access covers, cleaning eyes and blanking plates: Fit as the work proceeds.

605 PIPE ROUTES

- General: The shortest practical, with as few bends as possible.
    - Bends in wet portion of soil stacks: Not permitted.
    - Routes not shown on drawings: Submit proposals before commencing work.

610 FIXING PIPEWORK

- Pipework: Fix securely plumb and/ or true to line. Fix discharge stack pipes at or close below socket collar or coupling.
- Branches and low gradient sections: Fix with uniform and adequate falls to drain efficiently.
- Externally socketed pipes and fittings: Fix with sockets facing upstream.
- Additional supports: Provide as necessary to support junctions and changes in direction.
- Vertical pipes: Provide a load bearing support not less than every storey level. Tighten fixings as work proceeds so that every storey is self supporting.
- Wall and floor penetrations: Isolate pipework from structure, e.g. with pipe sleeves.
    - Masking plates: Fix at penetrations if visible in the finished work.
- Expansion joint sockets: Fix rigidly to the building.
- Fixings: Allow the pipe to slide.

615 FIXING VERTICAL PIPEWORK TAKING FOUL WASTE.

- Bracket fixings: Plugged and screwed into masonry / timber studwork as appropriate.
- Distance between bracket fixing centres (maximum): 1800mm.

620 FIXING LOW GRADIENT PIPEWORK TAKING FOUL WASTE.

- Bracket fixings: Plugged and screwed to masonry / timber framing as appropriate.
- Distance between bracket fixing centres (maximum): 500mm for pipes up to 50mm diameter; 900mm for pipes over 50mm diameter.

630 JOINTING PIPEWORK – GENERALLY

- General: Joint with materials, fittings and techniques that will make effective and durable connections.
- Jointing differing pipework systems: With adaptors intended for the purpose.
- Cut ends of pipes: Clean and square. Remove burrs and swarf. Chamfer pipe ends before inserting into ring seal sockets.
- Jointing or mating surfaces: Clean and, where necessary, lubricate immediately before assembly.
- Junctions: Form with fittings intended for the purpose.
- Jointing material: Do not allow it to project into bore of pipes and fittings.
- Surplus flux, solvent jointing materials and cement: Remove from joints.

660 JOINTING PIPEWORK – ABS, MUPVC, PVC-C AND PVC-U
- Jointing: Solvent welded.

680 ELECTRICAL CONTINUITY
- Joints in metal pipes with flexible couplings: Make with clips (or suitable standard pipe couplings) supplied for earth bonding by pipework manufacturer to ensure electrical continuity.

685 IDENTIFICATION OF INTERNAL FOUL DRAINAGE PIPEWORK
- Markings: To BS 1710.
    - Type: Black bands with arrows to indicate direction of flow.
    - Wording: “Foul Drainage” in white lettering on a black background.
- Type: Integral lettering on pipe wall, self-adhesive bands or identification clips.
- Locations: At 500 mm centres, junctions and both sides of slabs, valves, appliances, bulkheads and wall penetrations.

695 DISCHARGE AND VENTILATING STACKS
- Terminations: Perforated cover or cage that does not restrict airflow.
    - Material: Plastics, to match discharge stacks.

700 INSTALLING AIR ADMITTANCE VALVES
- Position: Vertical, above flood level of highest appliance served and clear of insulation materials (other than the manufacturer’s insulating cover).
- Connection to discharge stack: Allow removal for rodding, e.g. ring seal.
- Roof spaces and other unheated locations: Fit manufacturer’s insulating cover.

COMPLETION

905 PIPEWORK AIRTIGHTNESS TEST
- Preparation:
    - Open ends of pipework: Temporarily seal using plugs.
    - Test apparatus: Connect a ‘U’ tube water gauge and air pump to pipework via a plug or through trap of an appliance.
- Testing: Pump air into pipework until gauge registers 38 mm.
- Required performance: Pressure of 38 mm is to be maintained without loss for at least three minutes.

915 PREHANDOVER CHECKS
- Temporary caps: Remove.

- Permanent blanking caps, access covers, rodding eyes, floor gratings and the like: Secure complete with fixings.

920 SUBMITTALS
- Manufacturer's instructions for grease traps: Handover at completion.

R12 DRAINAGE BELOW GROUND

To be read with Preliminaries/General conditions.

GENERALLY

106 IN SITU CONCRETE:
- Unless specified otherwise, in situ concrete for use in drainage below ground to be to BS 5328, mix C25
or an equivalent or better mix subject to approval.
- Different mixes may be used for different parts of the drainage work.
-

PRODUCTS

315 ONE PIECE GULLIES AND COVERS AT FEET OF RAINWATER PIPES
- Standards:
  - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
  - Polypropylene: To BS EN 1852-1.
- Material: Plastics.
- Manufacturer: Contractor's choice.
- Outlet sizes: 100mm diameter.
- Covers:
  - Type: Screwed down grating.
  - Material: Plastic.
  - Sizes: To suit outlet size.
  - Loading grades to BS EN 124: A15.

329 PIPES, BENDS AND JUNCTIONS - SUPPLY
- Pipes and fittings: From same manufacturer for each pipeline.

346 PIPES, BENDS AND JUNCTIONS - PVC-U - PLAIN WALL TO NEW FOUL WATER DRAINS UNDER AND ADJACENT TO CAFÉ.
- Standard: BS EN 1401-1, class SN4, with flexible joints, Kitemark certified.
- Manufacturer: Contractor's choice.
- Recycled content: Not permitted.
- Sizes: See drawings for lines and sizes of pipes.

Application area code: UD.

347 PIPES, BENDS AND JUNCTIONS - PVC-U - PLAIN WALL TO NEW STORMWATER DRAINS UNDER AND ADJACENT
- Standard: BS EN 1401-1, class SN4, with flexible joints, Kitemark certified.
- Manufacturer: Contractor's choice.
- Recycled content: Not permitted.

- Sizes: See drawings for lines and sizes of pipes.

Application area code: UD.

407 MANHOLES AND INSPECTION CHAMBERS INTERNALLY

Bases: 150mm thick concrete, projecting 100mm beyond external faces of walls.
Walls: 100mm thick, 7N concrete blockwork, with mortar joints, internal size to be 600mm x 450mm.
Channels and Branches:
Benching: 1:2:4 concrete.
Internal Finish to Walls and Benching: 1:3 cement / sand render, with steel trowel finish.
Covers: See Clause 471.
Steps: Required in chambers over 900mm deep.

407A MANHOLES AND INSPECTION CHAMBERS EXTERNALLY

- Standards:
- To BS 5911-3 and BS EN 1917 and Kitemark certified; or
- To BS 5911-4 and BS EN 1917.

Manufacturer: Contractor's choice.

- Shape: Circular.
- Cement type and content: To BS 5911 – 4 and BS EN 1917.
- Chamber sections:
  - Product reference: Precast concrete chamber sections with concrete surround.
  - Jointing type: Mortar.
- Cover slabs:
  - Product reference: Reinforced concrete to BS 5911 Part 1.
  - Loading grades to BS EN 124: D400.
  - Openings: To suit access covers.
- Steps: Required in chambers over 900mm deep.

433 MANHOLE CHANNELS AND BRANCHES - CONVENTIONAL
- Material: Clay.
- Manufacturer: Contractor's choice.

435 MANHOLE CHANNELS AND BRANCHES - PREFORMED PLASTICS
- Manufacturer: Contractor's choice.

439 MANHOLE STEPS TO ALL MANHOLES OVER 900MM DEEP.
- Standard: To BS EN 13101.
- Type: D.
- Manufacturer: Contractor's choice.
- Material: Plastics coated steel.

446 SEALING FOR CONCRETE MANHOLES - MORTAR
- Manufacturer: Contractor's choice.

471 ACCESS COVERS AND FRAMES TO MANHOLES INSIDE
- Standard: To BS EN 124.

- Types: Double seals and grease.
- Manufacturer: Contractor's choice.
- Materials: Ductile cast iron.
- Finishes: Hot dipped galvanised.
- Sizes: 600mm x 450mm.
- Loading grades to BS EN 124: A 15.

471A ACCESS COVERS AND FRAMES TO MANHOLES OUTSIDE
- Standard: To BS EN 124.
- Types: Single seal.
- Manufacturer: Contractor's choice.
- Materials: Ductile cast iron.
- Finishes: Hot dipped galvanised.
- Sizes: 675mm x 675mm.
- Loading grades to BS EN 124: B 125.

483 CONCRETE (GENERAL)
- Standard: To BS 8500-2.
- Concrete: GEN 1.

485 CONCRETE (STRUCTURAL)
- Standard: To BS 8500-2.
- Concrete: GEN 3.

496 GRANULAR MATERIAL
- Standard: To BS EN 12620.
- Recycled content: None permitted.
- Size: Dependent on location - see Execution clauses in this section, and in sections R16, R17 and R18, if used.

498 GRANULAR SUB-BASE MATERIAL
- Standard: To Highways Agency Volume 1, 'Specification for Highway Works', Type 1 Unbound mixtures for sub-base.
- Recycled content: None permitted.

EXECUTION

610 STRIPPING OUT
- Extent of stripping out: As shown on drawings.
- Exposed ends of existing drainage to be abandoned: Seal with concrete (general).

611 EXISTING DRAINS
- Setting out: Before starting work, check invert levels and positions of existing drains, sewers, inspection chambers and manholes against drawings. Report discrepancies.
- Protection: Protect existing drains to be retained and maintain normal operation if in use.

613 EXCAVATED MATERIAL
- Turf, topsoil, hardcore, etc: Set aside for use in reinstatement.

616 SELECTED FILL FOR BACKFILLING

- Selected fill: As-dug material, free from vegetable matter, rubbish, frozen soil and material retained on a 40 mm sieve.
- Compaction: By hand in 100 mm layers.

623 LOWER PART OF TRENCH - GENERAL
- Trench up to 300 mm above crown of pipe: Vertical sides, width as small as practicable.
- Width (minimum): External diameter of pipe plus 300 mm.

631 TYPE OF SUBSOIL
- General: Where type of subsoil at level of crown of pipe differs from that stated for the type of bedding, surround or support, give notice.

635 FORMATION FOR BEDDINGS
- Timing: Excavate to formation immediately before laying beddings or pipes.
- Mud, rock projections, boulders and hard spots: Remove. Replace with consolidated bedding material.
- Local soft spots: Harden by tamping in bedding material.
- Inspection of excavated formations: Give notice.

TYPE(S) OF PIPELINE

151 PLASTICS PIPELINES FOUL & SW
- Pipes, bends and junctions: PVC-U to BS 4660 or BS 5481, with flexible joints, Kite mark certified.
  Manufacturer and reference: Terrain or equal
  Size(s): 100mm
- Assumed type of subsoil: shillet
  Bedding: Pea gravel 100mm below pipe.

EXCAVATING / BACKFILLING

205 EXCAVATED MATERIAL: Unless otherwise specified, set aside turf, topsoil, hardcore, etc. for use in reinstatement.

210 LOWER PART OF TRENCH: From bottom up to 300mm above crown of pipe the trench must have vertical sides and be of a width as small as practicable but not less than external diameter of pipe plus 300mm or larger dimension if specified.

230 ASSUMED TYPE OF SUBSOIL: Where the type of subsoil at the level of the crown of the pipe differs from that stated for the type of pipeline, obtain instructions before proceeding.

240 FORMATION FOR BEDS GENERALLY:
- Excavate to formation immediately before laying beds or pipes.
- Remove mud, rock projections, boulders and hard spots and replace with consolidated bedding material.
- Harden local soft spots by tamping in bedding material.
- Inform CA in advance to give him reasonable opportunity to inspect excavated formation for each section of the work.

270 BACKFILLING TO PIPELINES GENERALLY: Unless specified otherwise, backfill from top of specified surround or protective cushion with material excavated from the trench, compacted in layers not exceeding 300mm thick. Do not use heavy compactors before there is 600mm of material over pipes.

280 BACKFILLING UNDER ROADS AND PAVINGS: Backfill from top of specified surround or protective cushion up to formation level with Granular Sub base Material Type 1 to DOT Specification for Highway Works, Clause 803, laid and compacted in 150mm layers.

BEDDING / JOINTING

310 INSTALLATION GENERALLY:

- Obtain pipes and fittings for each pipeline from the same manufacturer unless otherwise specified. Joint differing pipes and fittings with adaptors recommended by pipe manufacturer.
- Lay pipes to true line and regular gradient on an even bed for the full length of the barrel with sockets (if any) facing up the gradient.
- Joint using recommended lubricants, leaving recommended gaps at ends of spigots to allow for movement.
- Adequately protect pipelines from damage and ingress of debris. Seal all exposed ends during construction.
- Arrange the work to minimise time between laying and testing. Backfill after successful testing.

350 GRANULAR BED:

- Granular material: To BS 882:

Pipe size (DN)	Nominal single size (mm)
100 & 150	10

- Lay and compact to a thickness not less than 100mm for socket over full width of trench. Where trench bottom is uneven due to hard spots or other reason, increase depth by 100mm. Scoop out locally at couplings/sockets and lay pipes digging slightly into bed and resting uniformly on their barrels. Adjust to line and gradient.
- After initial testing, backfill to 150mm (250mm for adoptable sewers) above crown of pipe with a protective cushion of selected fill, free from vegetable matter, rubbish, frozen soil and material retained on a 40mm sieve. Compact by hand in 100mm layers.

470 TRENCHES LESS THAN ONE METRE FROM FOUNDATIONS: Where bottom of trench is lower than bottom of foundation, use Class Z concrete surround as clause 461. Top of concrete to be not lower than bottom of foundation.

520 BENDS AT BASE OF SOIL STACKS:

- Unless specified otherwise, use a 90 degrees nominal rest bend with a minimum radius of 200mm to centreline of the pipe.
- Invert of horizontal drain at base of stack to be not less than 450mm below centreline of lowest branch pipe.
- Stabilize bend(s) by bedding in concrete without impairing the flexibility of couplings.

525 DIRECT CONNECTION OF GROUND FLOOR WCS TO DRAINS:

- Drop from crown of WC trap to invert of drain must not exceed 1.5m.
- Horizontal distance from the drop to a ventilated drain must not exceed 6m.

570 FLEXIBLE COUPLINGS:

- To BS EN 295-4, WIS 4-41-01, or Agrément certified.
  Manufacturer and reference(s): supersleeve
- Ensure that the ends of pipes to be joined are cleanly cut and square.
- Ensure that outer surfaces of pipes to be joined are clean and smooth. Where necessary, e.g. on concrete or iron pipes, smooth out mould lines and/or apply a cement grout over the sealing area.

TERMINAL / ACCESS FITTINGS

680 MANUFACTURE: Obtain each complete assembly of fittings, traps, etc., including appropriate couplings, from the same manufacturer, and check compatibility of components with each other and with the pipe system.

MANHOLES / CHAMBERS / SOAKAWAYS / TANKS

740 PLASTICS INSPECTION CHAMBERS

- Manufacturer and reference: Contractors choice
- Bedding: 100mm gravel
- Surround: ditto
- Concrete collar: min 150mm wide x 150 deep 1:2:4 concrete
- Access covers and seating: cast iron grade A to yard, C to pedestrian areas

710 CATCHPIT: TO NEW STORMWATER DRAINAGE

- Bases: 150 mm thick plain concrete, mix as specified under Generally.
- Blockwork 7N in 1:3 mortar 225mm wide
- Cover grade C cast iron for pedestrian areas, grade A where vehicles are in use.

CLEANING / TESTING / INSPECTION

910 TESTING/INSPECTION GENERALLY:

- Give CA advance notice to allow the opportunity to attend all tests and inspections.
- Give the Statutory Authority appropriate notice to enable pipelines to be inspected and tested as required.
- Provide water, assistance and apparatus as required.
- All lengths of drain, manholes and inspection chambers must pass the tests specified. If permitted test loss or infiltration is exceeded, remedy defect(s) before retesting after an appropriate period.

920 WATER/AIR TESTING OF GRAVITY DRAINS AND PRIVATE SEWERS UP TO DN 300:

- To ensure that pipelines are sound and properly installed, air test short lengths to BS 8301, paragraph 25.6.3 immediately after completion of bedding/surround.
- For final checking and statutory authority approval, water test to BS 8301, paragraph 25.6.2 all lengths of pipeline from terminals and connections to manholes/chambers and between manholes/chambers.
-

673 BEDDING / SURROUND TO FOUL AND STORMWATER DRAINAGE PIPES

- Type of subsoil: Soft silt.
- Line bottom and sides of trench with geotextile filter membrane.
- Granular material:
    - Pipe sizes DN 100 to DN 225: Single Size 10mm or 14mm. Graded 14mm to 5mm.
    - Pipe sizes DN 250 to DN 375: Single Size 14mm. Graded 14mm to 5mm.
    - Pipe sizes DN 400 to DN 500: Single Size 20mm. Graded 20mm to 5mm.
    - Pipe sizes over DN 500: Single Size 40mm. Graded 40mm to 5mm.
- Bedding:
    - Material: Granular, compacted over full width of trench.
    - Thickness (minimum): 150 mm (under sockets).
- Pipes: Dig slightly into bedding, rest uniformly on barrels and adjust to line and gradient.
- Initial testing before placing surround: Required.
- Surround:
    - Material: Granular.
    - Depth: To 150 mm above crown of pipe.

Compaction: By hand.

Extend geotextile membrane over top of granular surround.

- Backfilling:
    - Material: Type 803 backfill.
    - Depth: Up to ground level.

Compaction: First 150mm to be compacted by hand. Remainder to be undertaken in layers not exceeding 225mm unconsolidated thickness.

678 CLASS Z SURROUND TO PIPE RUNS

- Type of subsoil: Soft silt.
- Blinding:
    - Material: Concrete (general).
    - Thickness (minimum): 25 mm.
    - Width: Full width of trench.
    - Allow to set before proceeding.
- Pipes:
    - Temporary support: Folding wedges of compressible board. Prevent flotation.
    - Clearance under pipes (minimum): 100 mm.
    - Adjust pipes to line and gradient.
- Initial testing before placing surround: Required.
- Surround:
    - Material: Concrete (structural).
    - Depth: To 150 mm above crown of pipe.
    - Width: Full width of trench.
- Vertical construction joints:
    - Location: At face of flexible pipe joints.
    - Material: 18 mm thick compressible board precut to profile of pipe.
    - Socketed pipes: Fill gaps between spigots and sockets with resilient material to prevent entry of concrete.

680 CONCRETE SURROUND FOR PIPE RUNS NEAR FOUNDATIONS

- Class Z surround: Provide in locations where bottom of trench is lower than bottom of foundation and as follows (horizontal clear distance between nearest edges of foundations and pipe trenches):
  - Trenches less than 1 m from foundations: Top of concrete surround not lower than bottom of foundation.
  - Trenches more than 1 m from foundations: Top of concrete surround not lower than D mm below bottom of foundation, where D mm is horizontal distance of trench from foundation, less 150 mm.

683 LAYING PIPELINES

- Laying pipes: To true line and regular gradient on even bed for full length of barrel with sockets (if any) facing up the gradient.
- Ingress of debris: Seal exposed ends during construction.
- Timing: Minimize time between laying and testing.

685 JOINTING PIPELINES

- Connections: Durable, effective and free from leakage.
- Junctions, including to differing pipework systems: With adaptors intended for the purpose.
- Cut ends of pipes: Clean and square. Remove burrs and swarf. Chamfer pipe ends before inserting into ring seal sockets.
- Jointing or mating surfaces: Clean and, where necessary, lubricate immediately before assembly.
- Allowance for movement: Provide and maintain appropriate clearance at ends of spigots as fixing and jointing proceeds.
- Jointing material: Do not allow to project into bore of pipes and fittings.

689 PIPELINES PASSING THROUGH STRUCTURES

- Pipelines that must be cast in or fixed to structures (including manholes, catchpits and inspection chambers): Provide 600 mm long rocker pipes adjacent to the external face of the structure (or both faces where appropriate, e.g. walls to footings), with flexible joints at both ends.
  - Distance to rocker pipe from structure (maximum): 150 mm.
- Provision for movement for pipelines that need not be cast in or fixed to structures (e.g. walls to footings):
  - Rocker pipes as specified above; or
  - Openings in the structures to give 50 mm minimum clearance around the pipeline. Closely fit a rigid sheet to each side of opening to prevent ingress of fill or vermin.

691 BENDS AT BASE OF SOIL STACKS

- Type: 2 no. nominal 45 degree bends.
  - Radius to centreline of pipe (minimum): 200mm.
- Height of invert of horizontal drain at base of stack below centreline of lowest branch pipe (minimum): 450mm.
- Bedding: Do not impair flexibility of pipe couplings.
  - Material: Concrete (general).

697 INSTALLING FLEXIBLE COUPLINGS

- Ends of pipes to be joined: Cut cleanly and square.

- Outer surfaces of pipes to be joined: Clean and smooth. Where necessary, e.g. on concrete or iron pipes, smooth out mould lines and/ or apply a cement grout over the sealing area.
- Clamping bands: Tighten carefully to make gastight and watertight seals.

705 INITIAL TESTING OF PIPELINES
- Before testing:
    - Cement mortar jointing: Leave 24 h.
    - Solvent welded pipelines: Leave 1 h.
- Method: Block open ends of pipelines to be tested and pressurise. Air test short lengths to BS EN 1610.

715 BACKFILLING TO PIPELINES
- Backfilling above top of surround or protective cushion: Material excavated from trench, compacted in layers 300 mm (maximum) thick.
- Heavy compactors: Do not use before there is 600 mm (total) of material over pipes.

720 BACKFILLING UNDER ROADS AND PAVINGS
- Backfilling from top of surround or protective cushion up to formation level: Granular sub-base material, laid and compacted in 150 mm layers.

728 LAYING WARNING MARKER TAPES
- Installation: During backfilling, lay continuously over pipelines.
- Depth: 300-400 mm.
    - Pipelines deeper than 2 m: Lay an additional tape 600 mm above the top of the pipeline.

734 INSTALLING ACCESS POINTS AND GULLIES
- Bedding:
    - Material: Concrete (general).
    - Thickness (minimum): 100mm .
- Surround:
    - Material: Concrete (general).
    - Thickness (minimum): 100mm.
    - Height: To full height.
- Backfilling: Not required.
- Setting out relative to adjacent construction features: Square and tightly jointed.
- Permissible deviation in level of external covers and gratings: +0 to -6 mm.
- Raising pieces (clay and concrete units): Joint with 1:3 cement:sand mortar.
- Exposed openings: Fit purpose made temporary caps. Protect from site traffic.

736 INSTALLING RODDING POINTS
- Bedding and surround:
    - Material: Concrete (general).
    - Thickness (minimum): 100mm.
- Permissible deviation in level of external covers and gratings: +0 to -6 mm.

753 FIXING MANHOLE STEPS
- Fixing: Bed in joints.

- Positioning: 300 mm vertical centres staggered 300 mm horizontally, with lowest step 300 mm (maximum) above benching and top step 450 mm (maximum) below top of cover.

755 JOINTING CONCRETE MANHOLE CHAMBER SECTIONS
- Jointing and sealing: Mortar.
- Inner joint surface: Trim surplus jointing material extruded into chamber and point neatly.

757 LAYING CONVENTIONAL CHANNELS, BRANCHES AND BENCHING
- Main channel: Bed solid in 1:3 cement:sand mortar.
    - Branches: Connect to channel, preferably at half pipe level, so that discharge flows smoothly in direction of main flow.
    - Branches greater than nominal size 150 mm: Connect the branch soffit level with the main drain soffit.
    - Connecting angles more than 45° to direction of flow: Use three-quarter section channel bends.
- Benching:
    - Material: Concrete.
    - Profile: Rise vertically from top of main channel to a level not lower than soffit of outlet pipe, then slope upwards at 10% to walls.
    - Topping:
      Material: 1:3 cement / sand mortar.
      Application: Before benching concrete has set, and with dense smooth uniform finish.

773 INSTALLING ACCESS COVERS AND FRAMES
- Seating: On to concrete blockwork.
- Bedding and haunching of frames: Continuously.
    - Material: 1:3 cement / sand mortar.
    - Top of haunching: 30 mm below surrounding surfaces.
- Horizontal positioning of frames:
    - Centred over openings.
    - Square with joints in surrounding paving.
- Vertical positioning of frames:
    - Level; or
    - Marry in with levels of surrounding paving.
- Permissible deviation in level of external covers and frames: +0 to -6 mm.

776 EXPOSED OPENINGS IN INSPECTION CHAMBERS, ACCESS POINTS, FITTINGS AND EQUIPMENT
- General: Fit purpose made temporary caps. Protect from site traffic.

COMPLETION

901 REMOVAL OF DEBRIS AND CLEANING
- Preparation: Lift covers to manholes, inspection chambers and access points. Remove mortar droppings, debris and loose wrappings.
    - Timing: Before cleaning, final testing, CCTV inspection if specified, and immediately before handover.
- Cleaning: Thoroughly flush pipelines with water to remove silt and check for blockages. Rod pipelines between access points if there is any indication that they may be obstructed.
- Washings and detritus: Do not discharge into sewers or watercourses.

- Covers: Securely replace after cleaning and testing.

903 TEMPORARY MEASURES
- Water used to stabilize tanks and the like during installation: Drain.

911 TESTING AND INSPECTION
- Dates for testing and inspection: Give notice.
  - Period of notice: 48 hours.

921 FINAL TESTING OF PRIVATE GRAVITY DRAINS AND SEWERS UP TO DN 300
- Before testing:
  - Cement mortar jointing: Leave 24 h.
  - Solvent welded pipelines: Leave 1 h.
- Standard: To Building Regulations.
- Method: Contractor's choice.

941 WATER TESTING OF MANHOLES AND INSPECTION CHAMBERS
- Timing: Before backfilling.
- Standard:
  - Exfiltration: To BS EN 1610.
    Method: Testing with water (method W).
  - Infiltration: No identifiable flow of water penetrating the chamber.

S12 HOT AND COLD WATER

GENERAL INFORMATION/REQUIREMENTS

100 THE INSTALLATION: As contractor
-Special requirements: all WC cisterns, basin taps, sink taps to have ballofix CP valves, all other fittings to have gate valves.

111 ELECTRICAL WORK in connection with the installation will be included in the plumbing contractor's work and must be in accordance with BS 7671 'Requirements for Electrical Installations' (The IEE Wiring Regulations).

115 SERVICE CONNECTIONS are covered elsewhere by a Provisional Sum.

125 TESTING BY WATER AUTHORITY: Notify SWWA when installation is ready for testing, arrange and pay for any necessary inspection, rectify any defects identified by SWWA and obtain written consent for the installation.

GENERAL TECHNICAL REQUIREMENTS

130 CENTRALISED HOT WATER STORAGE: Design the system to meet the following requirements:
- Storage capacity, where not specified, to be sufficient to meet the assessed needs of the building and its occupants.
- Primary heat source, where not specified, to be capable of raising temperature of water from 10 deg C to 60 deg C within 1 hour.
- Maximum temperature of stored hot water: 65 deg C.

135 PIPELINE SIZES: Calculate sizes to suit the probable simultaneous demand for the building and to ensure:

- A water velocity of not more than 1.3 m/s for hot water and 2.0 m/s for cold water.
- Suitable discharge rates at draw off points.
- A filling time for the cold water storage cistern of not more than 1/4 hour.

140 DRAW OFF REQUIREMENTS:

All as BS 6700 Clause 8.

150 INSTALLATION GENERALLY:

- Install, test and commission the hot and cold water systems so that they comply with BS 6700, water supply byelaws, and the requirements of this section to provide a system free from leaks and the audible effects of expansion, vibration and water hammer.
- All installation work to be carried out by qualified operatives.
- Store all equipment, pipework components and accessories in original packaging in dry conditions. Protect plastics pipework from prolonged exposure to sunlight. Wherever practicable retain protective wrappings until Practical Completion.
- Securely fix equipment, components and accessories in specified/approved locations, parallel or perpendicular to the structure of the building unless specified otherwise, using fixing brackets/mountings, etc. recommended for the purpose by the equipment manufacturer.
- In locations where moisture is present or may occur, use corrosion resistant fittings/fixings and avoid contact between dissimilar metals by use of suitable washers, gaskets, etc.
- All equipment, pipework, components, valves, etc. forming the installation to be fully accessible for maintenance, repair or replacement unless specified or shown otherwise.
- Installation to be fitted with vents at high points and draining taps at low points to facilitate purging and draining.

160 BUILDER'S WORK: Comply with restrictions on the cutting of holes, chases, notches, etc. and methods of attachment to the building fabric specified in section P31.

181 DEZINCIFICATION: All brass fittings which are in contact with water to be DZR alloy CZ 132 and so marked, or gunmetal.

PIPELINES

510 COPPER PIPELINES FOR WATER SYSTEM

- Tube: To BS 2871:Part 1, table X, Kite mark certified.
- Jointing generally: Integral lead free solder ring capillary fittings to BS 864:Part 2, Kite mark certified.
- Connections to equipment and fittings: Compression fittings to BS 864:Part 2, Kite mark certified.
- Supports: compatible with pipework

  Centres as specified in clause 575.

515 PLASTICS COATED COPPER PIPELINES FOR OIL FEEDS

- Tube: To BS 2871: with seamless polyethylene coating to BS 3412.
- Jointing, connections to equipment and fittings: Compression fittings to BS 864:Part 2, Kite mark certified.

540 POLYETHYLENE PIPELINES FOR USE BELOW GROUND:
- Tube: Blue polyethylene to BS 6572, Kite mark certified.
- Jointing: Compression fittings to BS 864:Part 5, Kite mark certified.

550 PIPE SIZES: As shown on drawings.

560 PIPE RUNS:
- Where not shown accurately on drawings, obtain approval of routes before commencing work.
- Runs to be straight and parallel or perpendicular to walls, floors, ceilings, etc. as appropriate.
- Locate runs to facilitate installation of equipment, accessories and insulation and allow access for maintenance.
- Run hot pipes above cold where routed together horizontally; space well away from pipes containing drinking water.
- Do not run pipes through electrical enclosures or above switch gear distribution boards or the like.
- Allow sufficient space around pipes to fit insulation without compression.

570 PIPE FIXING:
- Fix pipes securely and neatly with the minimum number of joints, bends and offsets.
- Allow for thermal movement of pipelines and isolate from structure where necessary to prevent noise or abrasion of pipe caused by movement. Pipes passing through walls to be sleeved as specified in section P31.
- Temporarily seal open ends of pipes with purpose made plugs or blanking caps to prevent ingress of dirt during installation.
- Completed pipelines to be of smooth, consistent bore, clean and free from external scratching, tool marks, distortion, wrinkling, cracks, and other defects.

575 SUPPORTS FOR COPPER PIPELINES: Fix securely and true to line at not more than the following centres:

Pipe o.d. (mm)	Horizontal (mm)	Vertical (mm)
15 and 22	1200	1800
28 and 35	1800	2400
42 and 54	2400	3000

Provide additional supports as necessary within 150 mm of connections, junctions and changes of direction.

590 PIPE SPACING: Minimum clearance to face of wall-fixed pipes or pipe insulation:

From floor:	150 mm
From ceiling:	50 mm
From wall:	15 mm
Between pipes:	25 mm
From electrical conduit, cables, etc:	150 mm

600 JOINTS IN COPPER/STAINLESS STEEL PIPELINES:
- Cut pipes square using a wheel cutter, remove burrs and make neat, clean, fully sealed joints, ensuring that pipe ends enter joint fittings to full depth.
- Do not use formed bends on exposed pipework except for small offsets. Form changes of direction with radius fittings unless otherwise approved.
- Use purpose designed adaptors for connecting dissimilar materials: do not improvise.

- Protect background and plastics pipes and fittings from heat damage when forming soldered joints. Clean off all flux residue. Do not use 'self-cleaning' fluxes.

630 WARNING PIPES TO CISTERNS:
- Material: white pvc
Jointing: solvent
Bore to be twice that of inlet pipe but not less than 32mm.
- Difference between normal water level and overflow level to be:
For cold water storage cisterns - not less than 32mm or equal to the bore of the warning pipe if greater.
For feed and expansion cisterns - sufficient to allow 20% increase in the volume of water in the tank plus 25mm.
- Vertical distance of water supply inlet above overflow level to be not less than the bore of the warning pipe.
- Fall to be not less than 1 in 10 with sufficient supports to prevent sagging, discharging separately in approved prominent positions with turned down ends.
- Turn down within the cistern, terminating 50mm below normal water level.
- Fit with insulation within the building where the pipe is in an uninsulated space and subject to freezing.

640 VENT PIPES to be open with no restrictions or valves and to rise continuously from system connection to discharge over cistern. Internal diameter not less than 20mm.

650 PIPELINES ENTERING BUILDINGS:
- To be laid not less than 750mm below finished ground level.
- If rising into building within 750mm of the external face of the external wall or if passing through a ventilated void below floor level, fit insulation extending from finished floor level to 600mm beyond external face of building.
- Seal both ends of pipe ducts with an approved non hardening, non cracking, water resistant compound to a depth of not less than 150mm.

660 EXTERNAL SUPPLY PIPELINES to be insulated where exposed to air and where less than 750mm below ground level.

670 INSULATION TO PIPELINES:
- Material: Preformed flexible closed cell or mineral fibre split tube with thermal conductivity not exceeding 0.045 W/mK.
Thicknesses:
Hot water pipelines: Equal to the outside diameter of the pipe up to a maximum of 40mm.
Cold water pipelines:
Internal: 25mm
Roof space: 32mm
External: 38mm.
Fire performance: Class 1 spread of flame when tested to BS 476: Part 7.
- Fit insulation to cold water pipelines in uninsulated spaces.
- Notwithstanding the requirements of BS 6700, clause 2.3, fit insulation to hot water pipelines in all locations other than short lengths in prominent positions adjacent to appliances.
- Fix securely and neatly in accordance with manufacturer's recommendations, ensuring continuity over fittings and at supports, leaving no gaps and with the split on 'blind' side of pipeline.
- Do not fit insulation until completion of testing.

CONTROLS

730 VALVES GENERALLY:

- Types approved for the purpose by the local water company and of the appropriate pressure/temperature ratings.
- Provided for isolation and regulation of all equipment and sub circuits.
- Located where they can be readily operated and maintained and adjacent to equipment which is to be isolated.
- Fitted with joints to suit the pipe material.
- Fitted with hand wheels where required for control purposes and lock shields where required for isolation or regulation of circuits or equipment.

740 STOP VALVES AND DRAW-OFF TAPS for above ground use:

Copper alloy to BS 1010:Part 2, Kite mark certified.

741 STOP VALVES for below ground use:

DZR Copper alloy CZ 132 to BS 5433.

750 GATE VALVES:

Copper alloy to BS 5154, Series B, Kite mark certified.

765 DRAINING TAPS:

Copper alloy to BS 2879, Type 1, hose connection pattern, Kite mark certified.

770 THERMOSTATIC MIXING VALVES FOR SHOWER

Manufacturer and reference: automatic thermostatic control shower with 22mm supply in Chrome pipework and fittings. Shower to have CP riser with adjustable CP head.

COMPLETION

810 TESTING:

- Give at least 3 days notice to CA of intention to commence testing.
- Carry out before fixing pipework insulation. Ensure that all pipework and equipment is secure and clean and cistern/ tank covers are fitted.
- Thoroughly flush out all parts of the system, fill with water, remove all air and check for leaks.
- Start boiler and run the system until all parts are at normal operating temperatures and then allow to cool to cold condition for a period of three hours. At both hot and cold conditions all joints, fittings and components must be free from leaks and signs of physical distress when tested for at least one hour.

820 TESTING SERVICE PIPELINE: Disconnect from the mains, fill with potable water, excluding all air, and test by applying at least twice the working pressure for one hour, during which there must be no leakage.

850 DOCUMENTATION: Hand over to the CA before Practical Completion:

- Copies of manufacturers' operating and maintenance instructions for all equipment and controls.

- Operating instructions for the system as a whole giving optimum settings for all controls (operating instructions for boilers/circulators must be permanently attached to the casing).
- As installed drawings showing the location of all circuits and operating controls.

860 OPERATING TOOLS: Provide all necessary tools for operation, maintenance and cleaning purposes, including keys for valves and vents. Hand over to CA on completion.

870 LABEL all isolating and regulating valves on primary circuits, stating their function.

T32 LOW TEMPERATURE HOT WATER HEATING AND SERVICES TO GAS APPLIANCES

To be read with Preliminaries/General conditions.

GENERAL INFORMATION/REQUIREMENTS

100 THE INSTALLATION: Contractor to design the whole system
- Drawing reference(s): see drawing schedule
- Heat source: oil fired boiler
- Heat emitters: warm air fan units generally, radiators to offices, staff rooms and corridors
- Circulation: hot water.

Control: control by zones linked to overall control.

V90 GENERAL LIGHTING AND POWER

GENERAL INFORMATION / REQUIREMENTS

100 THE INSTALLATION

105 REGULATIONS: Comply with:
- BS 7671 'Requirements for Electrical Installations', (The IEE Wiring Regulations).
- Requirements of the Electricity Supply Company.
- Approved Document P of the Building Regulations

110 ELECTRICITY SUPPLY:
- Liaise with the Electricity Supply Company as necessary to confirm or determine:
- The maximum demand of the installation.
- The nature of the supply, its suitability for the installation and the type of earthing arrangement
- The location of the incoming supply.
- Space requirements for the Company's switches, fuses and meters.
- A provisional sum for connection of a supply and earthing by the Electricity Supply Company is included elsewhere. Make all necessary arrangements at the earliest opportunity to ensure necessary alterations to the connection are completed when required.

115 ARRANGEMENT OF CIRCUITS: Divide the installation into separately controlled circuits as described below, further subdividing where necessary to ensure compliance with BS 7671

(The IEE Wiring Regulations): Note supply capacities relate to peak loading, diversity to be applied for total load.

Western Power: Arrange and pay for Western Power to remove the overhead line and provide new underground entry as shown to WP intake in new location. Provide new mains intake board.

120 EQUIPOTENTIAL BONDING: Install main and supplementary bonding conductors in accordance with the requirements of BS 7671 (The IEE Wiring Regulations).

130 INSTALLATION GENERALLY:

- Install, test and commission the electrical work in accordance with BS 7671 (The IEE Wiring Regulations), ensuring compliance with design and performance requirements, to provide a safe, well insulated, earth protected system capable of supplying the anticipated maximum demand.
- Installation work to be carried out by qualified electricians fully conversant with BS 7671 (The IEE Wiring Regulations).
- Fastenings, bushes, glands, terminals, connectors, clips, clamps and all other minor accessories necessary to complete the installation to be types recommended for the purpose by relevant equipment, accessories, etc. manufacturer.
- In locations where moisture is present or may occur, use corrosion resisting fastenings and avoid contact between dissimilar metals.

140 BUILDER'S WORK: Comply with restrictions on the cutting of holes, chases, notches, etc. and methods of attachment to the building fabric specified in section P31.

CONDUIT / TRUNKING / DUCTING

210 STEEL CONDUIT AND FITTINGS:

- Location/use: use generally finish plain galvanised
- To BS 4568:Parts 1 and 2.
  Manufacturer and reference: contractors choice
  Type: Seam welded with plain threadable ends.
  Size: In accordance with BS 7671 (The IEE Wiring Regulations).
  Fittings: MK metal clad

- Use maximum practical lengths to minimise number of joints. Form bends by machine and remove burrs from cut ends.
- Use bends and/or junction boxes at changes of direction. Do not use elbows or tees of any sort without approval.
- Fix securely with boxes fixed independently of conduit.
- Tightly screw all joints to ensure electrical continuity, with no thread showing. Use expansion couplings where conduit crosses movement joints in structure.
- Make secure connections to boxes, trunking, etc. with screwed couplings and provide rubber bushes at open ends.

250 INSTALLING CONDUIT IN CONCRETE: Fix securely to reinforcement and fix boxes to formwork to prevent displacement. Depth of concrete cover to be not less than specified for reinforcement.

260 DRAINAGE OF CONDUIT: Provide drainage outlets at lowest points in conduit installed externally and in locations where condensation may occur.

310 STEEL SURFACE TRUNKING SYSTEM:

- Location/use: lighting installation
- To BS 4678:Part 1.

Manufacturer and reference: Telemechanique Canalis

Size: In accordance with BS 7671 (The IEE Wiring Regulations).

Fittings: lighting wired for direct connection to canalis – provide additional 20 no connectors hand to Client

Mounting/support: provide unistrut to concrete soffit before ceiling is fixed

370 FIRE STOPPING OF TRUNKING/DUCTING: Seal internally with intumescent puttywhere they pass through fire resisting floors, ceilings, cavity barriers and the like.

CABLING

410 CABLES to be BASEC certified. Select types and sizes to suit operating conditions, ensuring compliance with BS 7671 (The IEE Wiring Regulations). Obtain approval before proceeding with installation.

420 CABLE ROUTES to be:

- Straight, vertical or horizontal and parallel to walls unless shown otherwise.
- In approved locations where exposed to view. When not specified otherwise, conceal cables wherever possible.
- Positioned at least 150mm clear of other services. Cables running parallel and adjacent to heating pipes to be located below the pipes.
- Concealed horizontal runs in walls, if unavoidable, to be located within 150mm of ceiling or between 150 and 300mm of floor.
- Concealed cable runs to wall switches and outlets to be vertically in line with the accessory.

430 INSTALLING CABLES GENERALLY:

- Do not commence internal cabling until the building is sufficiently enclosed to ensure permanently dry conditions.
- Install cables neatly and securely, adequately protected against accidental damage, adverse environmental conditions, mechanical stress and deleterious substances.
- Install cables without joints other than at equipment and terminal fittings. Do not use junction boxes without approval.
- Sleeve cables passing through masonry walls with conduit bushed at both ends.
- Do not run cables in spaces where they will be surrounded or covered by insulation. Where this is not practical, size cables accordingly and inform CA.

450 ARMOURED CABLE:

- Handle and install carefully to prevent damage to sheath and armouring.
- Do not install if cable and ambient temperature are, or have been for the previous 24 hours, below 0 deg C.
- Fit galvanized steel guards where cables are liable to mechanical damage.
- Bond armour to equipment and main earthing system.
- Make moisture proof connections to apparatus using sealed glands and PVC shrouds.

460 PVC SHEATHED CABLES:

- Do not install cables when the temperature is near or below freezing.

- Do not install in cavities of external walls.
- Fit insulating cable glands at entries to equipment.
- Terminate cable sheaths within boxes.

510 CABLES LAID DIRECTLY IN THE GROUND:
- Before laying cables, ensure that bottom of trench is even and free from sharp stones, roots, etc.
- Lay cables on a 75mm bed of sand.
- Where two or more cables are laid in the same trench, set 150mm apart.
- Cover each cable with 75mm of sand overlaid with cable covers to BS 2484.
- Mark each change in direction of cables with a precast concrete slab, size 300 x 300 x 150mm thick, impressed with 'LV CABLE' and laid level with finished ground level.

550 CABLES ENTERING BUILDING(S) FROM BELOW GROUND: Seal both ends of pipe duct to a depth of not less than 150mm, with an approved non hardening, non cracking, water resistant compound. Alternatively, fit a proprietary moulded pipe duct seal.

560 CABLES IN PLASTER: Cover with galvanized steel channel nailed to background.

570 CABLES IN VERTICAL TRUNKING/DUCTS:
- Support with pin racks or cleats at each floor level or at 5m vertical centres, whichever is less.
- Provide and fix heat barriers at not more than 5m centres where fire resisting barriers are not specified.

580 CABLES IN ACCESSIBLE ROOF SPACES: Cables running across ceiling joists to be fixed to timber battens nailed to joists.

EQUIPMENT / ACCESSORIES

610 CONSUMER CONTROL UNIT(S):
- To BS 5486:Part 13.
  Manufacturer and reference: contractors choice
- Main control:cut out
  Rating: To suit maximum demand.
- Number of ways: Total required plus 3 spare
  Each way to be permanently labelled to identify circuit and rating.
- Circuit protection:
  Miniature circuit breakers to BS EN 60898.
  30mA RCCB to BS 4293
- Enclosure: Plastics

650 ELECTRICAL ACCESSORIES: Types shown on drawings, complete with mounting boxes and, unless specified otherwise, to be from Forbes & Lomax

730 VENTILATING FAN(S):
To BS 3456:Part 102:Section 102.342. BEAB approved.
Manufacturer and reference: vent axia or equal

780 MULTIGANG SWITCHES: Connect switches so that there is a logical relationship with luminaires. Fit blanks to unused switch spaces.

SPECIAL SYSTEMS

840 SMOKE ALARMS:
Self-contained type to BS 5446:Part 1, Kite mark certified.
Manufacturer and reference: contractors choice
Operation: Mains with D.C. battery back-up.

COMPLETION

910 INSPECTION AND TESTING:
- To BS 7671 (The IEE Wiring Regulations:Part 7).
- Give not less than 24 hours notice before commencing tests.
- In addition to items required to be inspected or tested, ensure that labels and signs required by the Regulations are securely fixed in the correct locations.
- After satisfactory completion of tests submit two copies of inspection and completion certificates to CA.

930 INSPECTION, INITIAL TESTING, COMMISSIONING AND CERTIFICATION OF FIRE ALARM SYSTEM:
- To BS 5839:Part 1, clause 26.
- Give not less than 24 hours notice before commencing tests.
- After satisfactory completion of tests submit two copies of certificates to CA. Certificates to be as BS 5839:Part 1, Appendices B and C.

970 DOCUMENTATION: Hand over to the CA at Practical Completion:
- Copies of manufacturers' operating and maintenance instructions for all fittings and apparatus.
- As-installed drawings showing all circuits and their ratings and the locations of all fittings and apparatus.

Z10 PURPOSE MADE JOINERY: WINDOWS EXTERNAL DOORS INTERNAL DOORS

110 FABRICATION
- Standard: To BS 1186-2.
- Sections: Accurate in profile and length, and free from twist and bowing. Formed out of solid unless shown otherwise.
  - Machined surfaces: Smooth and free from tearing, wooliness, chip bruising and other machining defects.
- Joints: Tight and close fitting.
- Assembled components: Rigid. Free from distortion.
- Screws: Provide pilot holes.
  - Screws of 8 gauge (4 mm diameter) or more and screws into hardwood: Provide clearance holes.
  - Countersink screws: Heads sunk at least 2 mm below surfaces visible in completed work.
  - Adhesives: Compatible with wood preservatives applied and end uses of timber.

120 CROSS SECTION DIMENSIONS OF TIMBER

- General: Dimensions on drawings are finished sizes.
- Maximum permitted deviations from finished sizes:
  - Softwood sections: To BS EN 1313-1:-

Clause 6 for sawn sections.
Clause NA.2 for further processed sections.

  - Hardwood sections: To BS EN 1313-2:-

Clause 6 for sawn sections.
Clause NA.3 for further processed sections.

130 PRESERVATIVE TREATED WOOD

- Cutting and machining: Completed as far as possible before treatment.
- Extensively processed timber: Retreat timber sawn lengthways, thicknessed, planed, ploughed, etc.
- Surfaces exposed by minor cutting and/ or drilling: Treat with two flood coats of a solution recommended by main treatment solution manufacturer.

140 MOISTURE CONTENT

- Wood and wood based products: Maintained within range specified for the component during manufacture and storage.

250 FINISHING

- Surfaces: Smooth, even and suitable to receive finishes.
  - Arrises: Eased unless shown otherwise on drawings.
- End grain in external components: Sealed with primer or sealer as section M60 and allowed to dry before assembly.

100 SUPPLIER

- traditional casement Windows & Doors complete with furniture and glazing and external and internal doors (excluding furniture) are to be obtained from manufacturer.

110 FABRICATION GENERALLY:

- Fabricate joinery components to BS 1186:Part 2.
- Form sections out of the solid when not specified otherwise. Carefully machine timber to accurate lengths and profiles, free from twist and bowing. After machining, surfaces to be smooth and free from tearing, woolliness, chip bruising and other machining defects.
- Assemble with tight, close fitting joints to produce rigid components free from distortion.
- Screw heads to be countersunk not less than 2 mm below timber surfaces which will be visible in completed work. All screws to have clearance holes. Screws of 8 gauge or more and all screws into hardwood to have pilot holes.

120 CROSS SECTION DIMENSIONS of timber shown on drawings are nominal sizes unless stated otherwise. Reduction to finished sizes to be to BS 4471 for softwoods and BS 5450 for hardwoods. Deviation from the stated sizes will not be permitted unless prior approval is given.

130 PRESERVATIVE TREATED TIMBER:

- Carry out as much cutting and machining as possible before treatment.
- Retreat all timber which is sawn along the length, ploughed, thicknesses, planed or otherwise extensively processed.
- Treat surfaces exposed by minor cutting and drilling with two flood coats of a solution recommended for the purpose by main treatment solution manufacturer.

140 MOISTURE CONTENT of timber and wood based sheets to be maintained during manufacture and storage, within the range specified for the component.

250 FINISHING AND PROTECTING:
- Sand all joinery to give smooth, flat surfaces suitable to receive specified finishes. Arrises to be eased unless specified otherwise.
- Before assembly, seal all end grains for external components with primer or sealer as specified in section M60 and allow to dry.
- Protect completed joinery against damage, dirt, moisture and other deleterious substances.

Z12 PRESERVATIVE/ FIRE RETARDANT TREATMENT

To be read with Preliminaries/ General conditions.

110 TREATMENT APPLICATION
- Timing: After cutting and machining timber, and before assembling components.
- Processor: Licensed by manufacturer of specified treatment solution.
- Certification: For each batch of timber provide a certificate of assurance that treatment has been carried out as specified.

120 COMMODITY SPECIFICATIONS
- Standard: Current edition of the British Wood Preserving and Damp-proofing Association (BWPDA) Manual.

130 PRESERVATIVE TREATMENT SOLUTION STRENGTHS/ TREATMENT CYCLES
- General: Select to achieve specified service life and to suit treatability of specified wood species.

140 COPPER-ORGANIC PRESERVATIVE TREATMENT
- Solution:
  - Manufacturer: Contractor's choice.
- Application: High pressure impregnation.
- Moisture content of wood at time of treatment: Not more than 28%. After treatment, allow timber to dry before using.

150 COPPER CHROMIUM BASED PRESERVATIVE TREATMENT
- Solution:
  - Manufacturer: Contractor's choice.
  - Application: High pressure impregnation.
- Moisture content of wood at time of treatment: Not more than 28%. After treatment, allow timber to dry for at least 14 days before using.

160 ORGANIC SOLVENT PRESERVATIVE TREATMENT
- Solution:
  - Manufacturer: Contractor's choice.
  - Application: Double vacuum + low pressure impregnation, or immersion.
- Moisture content of wood at time of treatment: As specified for the timber/ component at time of fixing. After treatment, timber to be surface dry before use.

165 WATER BASED MICROEMULSION PRESERVATIVE TREATMENT

- Solution:
  - Manufacturer: Contractor's choice.
  - Application: Double vacuum + low pressure impregnation.
- Moisture content of wood at time of treatment: As specified for the timber/ component at time of fixing. After treatment, timber to be surface dry before use.

167 BORON COMPOUND PRESERVATIVE TREATMENT

- Solution:
  - Manufacturer: Contractor's choice.
  - Application: High pressure impregnation.
- Moisture content of wood at time of treatment: Not more than 28%. After treatment, allow timber to dry before using.

170 CREOSOTE PRESERVATIVE TREATMENT

- Solution:
  - Manufacturer: Contractor's choice.
  - Application: High pressure impregnation, or immersion.
- Moisture content of wood at time of treatment: Not more than 28%. After treatment, allow timber to dry before using.

210 FIRE RETARDANT TREATMENT

- Solution type: Humidity resistant.
  - Manufacturer: Contractor's choice.
  - Application: Vacuum + pressure impregnation.
- Moisture content of wood at time of treatment: As specified for the timber/ component at time of fixing. After treatment, timber to be redried slowly at temperatures not exceeding 65°C to minimize distortion and degradation.

220 LEACH RESISTANT FIRE RETARDANT TREATMENT

- Solution:
  - Manufacturer: Contractor's choice.
  - Application: Vacuum + pressure impregnation.
- Moisture content of wood at time of treatment: As specified for the timber/ component at time of fixing.

Z20 FIXINGS / ADHESIVES

To be read with Preliminaries/General conditions.

110 FIXING GENERALLY: Use fixing and jointing methods and types, sizes, quantities and spacings of fastenings which are suitable having regard to:

- Nature of and compatibility with product/material being fixed and fixed to,
- Recommendations of manufacturers of fastenings and manufacturers of components, products or materials being fixed and fixed to,
- Materials and loads to be supported,
- Conditions expected in use,
- Appearance, this being subject to approval.

120 FASTENINGS for materials and components forming part of external construction to be of corrosion resistant material or have a corrosion resistant finish.

140 FIXING THROUGH FINISHES: Ensure that fastenings and plugs (if used) have ample penetration into the backing.

160 CRAMP FIXING:

- Fix with stainless or galvanized steel strip cramps as BS 1243 vertical twist ties except with no twist, split one end only and once bent.
- Position cramps 150 mm from each end of jambs and at 600 mm maximum centres.
- Secure cramps to frames with two sherardized screws and fully bed in mortar.

230 PELLETING: Countersink screw heads 6 mm below timber surface and glue in grain-matched pellets not less than 6 mm thick, cut from matching timber. Finish off flush with face.

310 FASTENERS GENERALLY

- Materials: To have:
  - Bimetallic corrosion resistance appropriate to items being fixed.
  - Atmospheric corrosion resistance appropriate to fixing location.
- Appearance: Submit samples on request.

320 PACKINGS

- Materials: Noncompressible, corrosion proof.
- Area of packings: Sufficient to transfer loads.

340 MASONRY FIXINGS

- Light duty: Plugs and screws.
- Heavy duty: Expansion anchors or chemical anchors.

350 PLUGS

- Type: Proprietary types to suit substrate, loads to be supported and conditions expected in use.

390 ADHESIVES GENERALLY

- Standards:
  - Hot-setting phenolic and aminoplastic: To BS 1203.
  - Thremosetting wood adhesives: To BS EN 12765.
  - Polyvinyl acetate thermoplastic adhesive: To BS 4071.

410 POWDER ACTUATED FIXING SYSTEMS

- Types of fastener, accessories and consumables: As recommended by tool manufacturer.

610 FIXING GENERALLY

- Integrity of supported components: Select types, sizes, quantities and spacings of fixings, fasteners and packings to retain supported components without distortion or loss of support.
- Components, substrates, fixings and fasteners of dissimilar metals: Isolate with washers/ sleeves to avoid bimetallic corrosion.
- Appearance: Fixings to be in straight lines at regular centres.

620 FIXING THROUGH FINISHES

- Penetration of fasteners and plugs into substrate: To achieve a secure fixing.

630 FIXING PACKINGS

- Function: To take up tolerances and prevent distortion of materials and components.
- Limits: Do not use packings beyond thicknesses recommended by fixings and fasteners manufacturer.
- Locations: Not within zones to be filled with sealant.

640 FIXING CRAMPS

- Cramp positions: Maximum 150 mm from each end of frame sections and at 600 mm maximum centres.
- Fasteners: Fix cramps to frames with screws of same material as cramps.
- Fixings in masonry work: Fully bed in mortar.

670 PELLETED COUNTERSUNK SCREW FIXING

- Finished level of countersunk screw heads: Minimum 6 mm below timber surface.
- Pellets: Cut from matching timber, match grain and glue in to full depth of hole.
- Finished level of pellets: Flush with surface.

680 PLUGGED COUNTERSUNK SCREW FIXING

- Finished level of countersunk screw heads: Minimum 6 mm below timber surface.
- Plugs: Glue in to full depth of hole.
- Finished level of plugs: Projecting above surface.

690 USING POWDER ACTUATED FIXING SYSTEMS

- Powder actuated fixing tools: To BS 4078-2 and Kitemark certified.
- Operatives: Trained and certified as competent by tool manufacturer.

700 APPLYING ADHESIVES

- Surfaces: Clean. Adjust regularity and texture to suit bonding and gap filling characteristics of adhesive.
- Support and clamping during setting: Provide as necessary. Do not mark surfaces of or distrort components being fixed.
- Finished adhesive joints: Fully bonded. Free of surplus adhesive.

Z21 MORTARS

To be read with Preliminaries/General conditions.

Note: Only the mixes specified shall be used. Materials specified are to be obtained from the Cornish Lime Company Bodmin. Telephone 01208 79779. DO NOT ADD CEMENT OR CEMENT BASED PRODUCTS WHERE LIME MORTAR IS SPECIFIED. If alternative mixes are used the work shall be taken down and rebuilt at the contractors expense.

110 MORTAR MIX PROPORTIONS.

- Generally gauged mortar 1:2:9 is used except for stone where a lime mortar is to be used.

120 SAND FOR MORTAR:

- Generally to BS 882 except for lime mortar.

160 LIME FOR MORTAR:

- For new stonework St Astier 3.5 (1:3 mix)

- Pointing to stonework to be in St Astier 3.5 and CLS no 25 sand (1:3) all obtained from Cornish Lime Co. Pointing is to be slightly recessed with a stipple finish.

180 ADMIXTURES: Do not use in mortar unless specified or approved. Do not use calcium chloride or any admixtures containing calcium chloride.

200 SITE STORAGE:

- Store different sands and aggregates in different stockpiles on hard clean bases which allow free drainage.
- Store factory produced premixed lime:sand for mortars in covered containers to prevent excessive drying out or wetting.
- Store bags of hydrated lime in dry conditions, raised off the ground not touching damp surfaces. Do not use hydrated lime affected by damp.
- Avoid intermixing and contamination between stored materials and other building materials, debris or other deleterious matter.

210 MAKING MORTAR:

- Keep plant and banker boards clean at all times.
- Measure materials accurately by volume using clean gauge boxes. Proportions of mixes are for dry sand; allow for bulking if sand is damp.
- Mix ingredients thoroughly to a consistence suitable for the work and free from lumps. Mortars containing air entraining admixtures must be mixed by machine, but do not over mix. For lime mortar hire proper mixer – pan type.
- Do not mix mortar when the air temperature is at or below 3 deg c and falling or below 1 deg c and rising.
-

LIMES AND MORTARS

310 LIME:SAND MORTAR MIXES

- Specification: Proportions and additional requirements for mortar materials are specified elsewhere.

320 SAND FOR LIME:SAND MASONRY MORTARS

- Type: Sharp, well graded.
  - Quality, sampling and testing: To BS EN 13139.
  - Grading/ Source: As specified elsewhere in relevant mortar mix items.

330 READY PREPARED LIME PUTTY

- Type: Slaked directly from CL 90 quicklime to BS EN 459-1, using an excess of water.
  - Maturation: In pits/ containers that allow excess water to drain away.
  - Density of matured lime putty: 1.3–1.4 kg/litre.
- Maturation period before use (minimum): 30 days.

335 READY PREPARED LIME PUTTY

- Manufacturer: Contractor's choice.

- Maturation period before use (minimum): 30 days.

340 POZZOLANIC ADDITIVES FOR NONHYDRAULIC LIME:SAND MORTARS
- Manufacturer/ Supplier: Contractor's choice.
- Mixing: Mix thoroughly into mortar during knocking up.

345 ADMIXTURES FOR HYDRAULIC LIME:SAND MORTARS
- Air entraining (plasticizing) admixtures: To BS EN 934-3 and compatible with other mortar constituents.
- Prohibited admixtures: Calcium chloride, ethylene glycol and any admixture containing calcium chloride.

360 MAKING LIME:SAND MORTARS GENERALLY
- Batching: By volume. Use clean and accurate gauge boxes or buckets.
- Mixing: Mix materials thoroughly to uniform consistency, free from lumps.
- Contamination: Prevent intermixing with other materials, including cement.

370 SITE PREPARED NONHYDRAULIC LIME:SAND MORTARS
- Mixing: Mix materials thoroughly by compressing, beating and chopping. Do not add water.
  - Equipment: Roller pan mixer or submit proposals.
- Maturation period before use (maximum): 7 days.

380 READY TO USE NONHYDRAULIC LIME:SAND MORTARS
- Manufacturer: Contractor's choice.
- Materials: Select from:
  - Lime putty slaked directly from quicklime to BS EN 459-1 and mixed thoroughly with sand.
  - Quicklime to BS EN 459-1 slaked directly with sand.
- Maturation period before use (maximum): 7 days.

390 KNOCKING UP NONHYDRAULIC LIME:SAND MORTARS
- Knocking up before and during use: Achieve and maintain a workable consistency by compressing, beating and chopping. Do not add water.
  - Equipment: Roller pan mixer or submit proposals.

400 MAKING HYDRAULIC LIME:SAND MORTARS
- Mixing hydrated hydraulic lime:sand: Follow the lime manufacturer's recommendations for each stage of the mix.
  - Water quantity: Only sufficient to produce a workable mix.
- Working time: Within limits recommended by the hydraulic lime manufacturer.

Z22 SEALANTS

To be read with Preliminaries/General conditions.

110 SEALANT TYPES: As specified in the relevant section.

120 SUITABILITY OF JOINTS: Before commencing, check that:
- Joint dimensions are within limits specified for the sealant.
- Surfaces are smooth and undamaged.
- Preparatory work which must be done before assembly of the joint has been carried out.

Inform CA if joints are not suitable to receive sealant and submit proposals for rectification.

130 PREPARING JOINTS:

- Clean surfaces to which sealant must adhere using methods and materials recommended by sealant manufacturer.
- Remove all temporary coatings, tapes, loosely adhering material, dust, oil, grease and other contaminants which may affect bond.
- Keep joints clean and protect from damage until sealant is applied.
- Backing strip, bond breaker, primer: Types recommended for the purpose by sealant manufacturer.
- Insert backing strips and/or bond breaker tape into joint leaving no gaps.
- Cover adjacent surfaces with masking tape to prevent staining and protect surfaces which would be difficult to clean if smeared with primer or sealant.

160 APPLYING SEALANTS:

- Ensure that operatives observe manufacturer's and statutory requirements for storage and safe usage of sealants.
- Use equipment and methods recommended by sealant manufacturer and apply within the recommended application life of primer and sealant, and the recommended air and substrate temperature ranges.
- Do not apply to damp surfaces (unless recommended otherwise), to surfaces affected by ice or snow or during inclement weather. Do not heat joints to dry them or raise the temperature.
- Fill joints completely, leaving no gaps, excluding all air and ensuring firm adhesion of sealant to required joint surfaces. Tool the sealant to a neat, slightly concave profile unless specified otherwise.
- Protect until cured.

Z31 POWDER COATINGS

To be read with Preliminaries/ General conditions.

120 POWDER COATING MATERIALS

- Manufacturer: Obtain from one only of the following: Contractor’s choice.
- Selected manufacturer: Submit details before commencement of powder coating including:
  - Name and contact details.
  - Details of accreditation schemes.
  - Technical data of product including current Agrément certificates.

210 WORKING PROCEDURES

- Comply with the follow following standards.
  - Aluminium components: To BS 6496 or BS EN 12206-1.
  - Steel components: To BS EN 13438.
  - Safety standards: To British Coatings Federation ‘Code of safe practice – Application of thermosetting powder coatings by electrostatic spraying’.

220 POWDER COATING APPLICATORS

- Applicator requirements:
  - Approved by powder coating manufacturer.
  - Currently certified to BS EN ISO 9001.

- Comply with quality procedures, guarantee conditions, standards and tests required by powder coating manufacturer.
- Applicator to use only one plant.
- Selected applicator: Submit details before commencement of powder coating including:
  Name and contact details.
  Details of accreditation schemes.

225 GUARANTEES

- Powder coating manufacturer and applicator guarantees:
  - Submit sample copies before commencement of powder coating.
  - Submit signed project specific copies on completion of work.

310 PRETREATMENT OF ALUMINIUM COMPONENTS

- Condition of components to be pretreated:
  - Free from corrosion and damage.
  - All welding and jointing completed and finish off as specified.
  - Free from impurities including soil, grease, oil.
  - Suitable for and compatible with the pretreatment process.
- Conversion coating requirements:
  - Chromate system: To BS 6496 or BS EN 12206-1.
  - Chromate-free system: To BS EN 12206-1. Submit details before using.
- Rinsing requirements: Use demineralized water. Drain and dry.

320 PRETREATMENT OF STEEL COMPONENTS

- Condition of components to be pretreated:
  - Free from corrosion and damage.
  - All welding and jointing completed and finish off as specified.
  - Free from impurities including soil, grease, oil.
  - Suitable for and compatible with the pretreatment process.
- Conversion coating requirements: To BS EN 13438.
- Rinsing requirements: Use demineralized water. Drain and dry.

430 EXTENT OF POWDER COATINGS

- Application: To visible component surfaces, and concealed surfaces requiring protection. Coated surfaces will be deemed ‘significant surfaces’ for relevant BS 6496 or BS EN 13438 performance requirements.

435 APPLICATION OF POWDER COATINGS

- Surfaces to receive powder coatings: Free from dust or powder deposits.
- Powder colours: Obtain from one batch of one manufacturer.
- Commencement of powder coatings: To be continuous from pretreatment.
- Jig points: Not visible on coated components.
- Curing: Controlled to attain metal temperatures and hold periods recommended by powder coating manufacturer.
- Stripping and recoating of components: Only acceptable by prior agreement of powder coating manufacturer. Stripping, pretreatment and powder coating are to be in accordance with manufacturer’s requirements.
- Overcoating of components: Not acceptable.

440 PERFORMANCE AND APPEARANCE OF POWDER COATINGS

- For aluminium components:
  - Standard: To BS 6496 or BS EN 12206-1.
- For steel components:
  - Standard: To BS EN 13438.
- Visual inspection after powder coating: Significant surface viewing distances to be as specified in the relevant Standard, unless specified otherwise.
- Colour and gloss levels: To conform with approved samples.

450 ALUMINIUM ALLOY FABRICATIONS

- Units may be assembled:
  - Before powder coating.
  - From components powder coated after cutting to size.
  - Where approved, from components powder coated before cutting to size.
- Exposure of uncoated background metal: Not acceptable.
- Assembly sealants: Compatible with powder coatings. Obtain approval of colour if sealants are visible after fabrication.

460 STEEL FABRICATIONS

- Unit assembly: Wherever practical, before powder coating.
- Exposure of uncoated background metal: Not acceptable.
- Assembly sealants: Compatible with powder coatings. Obtain approval of colour if sealants are visible after fabrication.

470 FIXINGS

- Exposed metal fixings: Powder coat together with components, or coat with matching repair paint system applied in accordance with the powder coating manufacturer's recommendations.

480 DAMAGED COMPONENTS – REPAIR/ REPLACEMENT

- Before delivery to site: Check all components for damage to powder coatings. Replace damaged components.
- Site damage: Submit proposals for repair or replacement.

510 PROTECTION

- Powder coated surfaces of components: Protect from damage during handling and installation, or by subsequent site operations.
- Protective coverings: Must be:
  - Resistant to weather conditions.
  - Partially removable to suit building in and access to fixing points.
- Protective tapes in contact with powder coatings: Must be:
  - Low tack, self adhesive and light in colour.
  - Applied and removed in accordance with tape and powder coating manufacturers' recommendations. Do not use solvents to remove residues as these are detrimental to the coating.
- Inspection of protection: Carry out monthly. Promptly repair any deterioration or deficiency.

535 DOCUMENTATION

- Submit the following information for each batch of powder coated components:

- Supplier.
- Trade name.
- Colour.
- Type of powder.
- Method of application.
- Batch and reference number.
- Statutory requirements.
- Test certificates.
- Maintenance instructions.

540 COMPLETION

- Protection: Remove
- Cleaning and maintenance of powder coatings: Carry out in accordance with procedures detailed in powder coating manufacturer and applicator guarantees.