ARCHITECTURAL, CIVIL & STRUCTURAL

GENERAL SPECIFICATION

CLIMATE ACTION SUMMER WORKS SCHEME 2026

NEW SCIENCE ROOMS, TECHNICAL GRAPHICS AREA AND ASSOCIATED WORKS AT ST. DOMINIC'S COLLEGE, CABRA, DUBLIN 7 D07NX4 ROLL NO: 60731FST

For

BOARD OF MANAGEMENT OF ST. DOMINICS COLLEGE CABRA, RATOATH ROAD, ASHDOWN, DUBLIN 7.

NJOG Project No. 26/009

REV	DESCRIPTION	DATE	BY	APPROVED	DOCUMENT
0	Tender Issue	June 2026	SK	JOD	26/009 f7.4

Specification for new Science & Technical Graphics Rooms, Toilet Area and all associated works at Halla Lydia, St Dominic's College Cabra, Ratoath Road, Ashdown, Dublin 7.

CONTENTS LIST

C10 DEMOLITION & GENERAL SITE WORKS

To be read with Preliminaries/General conditions.

GENERALLY

100 DEMOLISION GENERALLY
Demolition generally shall be carried out in accordance with **BS 6187.**

110 SAFETY OF OCCUPANTS:
When a building or terrace is to be partially demolished, take all necessary steps to ensure that the safety of any occupant of the remaining portion is not put at risk at any time by the process of demolition. If necessary, occupants of remaining portions shall be evacuated.

120 PROTECTION:
Where works of demolition are likely to result in the discharge of materials or debris on an adjoining property not being part of the demolition site, erect protective coverings, full height screens or fans or a temporary closure applied to the adjoining rooms. Fans shall be of adequate strength for the purpose for which they are required and shall if necessary, be waterproofed and laid to fall so that there is no likelihood of water drips falling upon persons using the adjoining rooms.

130 MINIMISING DUST:
Take all precautions to minimise dust arising from the demolition work.

140 SECURITY:
Ensure that any building that is partly demolishing is, as far as possible, properly secured or closed against entry at all times when demolition operations are not in progress, and that the building is left in a safe condition at the end of each days work.

150 EXPOSURE TO HAZARDOUS SUBSTANCES:
Take all possible steps to prevent exposure of persons to substances hazardous to health that are or could be present during demolition work. For demolition work on buildings where asbestos dust or fumes may be encountered, which may prejudice the health of any persons working or dwelling in the vicinity of the site all work shall comply with the recommendations of the Health and Safety Inspectorate and shall be in accordance with all other current legislation and relevant Codes of Practice.

170 TEMPORARY SUPPORT:
The removal of certain portions of a structure may result in other portions becoming unsafe and the contractor shall determine where temporary supports will be needed. If the structure to be demolished abuts other buildings, the abutting shall be given lateral support as is given by the structure to be demolished.

180 WARNING NOTICES:
Every working place of demolition and approach thereto shall be properly identified with warning notices and shall if necessary be properly illuminated.

190 OVERLOADING ON SCAFFOLDING PLATFORMS:
Ensure that the load from any debris or materials collecting on the scaffold does not exceed the loading assumed for the design of the scaffold and means shall be taken to prevent debris or materials from being dislodged from the platforms.

200 OVERLOADING OF STRUCTURE:
Do not permit overloading of any part of a structure by debris or materials arising from demolition or any other activity.

210 DANGER FROM FALLING DEBRIS:
Where materials or debris are to be lowered, ensure that this is done in a manner that will not create a danger to persons or property. Debris shall only be allowed to fall freely to the ground where it can cause no damage or danger and where the horizontal distance is not less than 6 m or half the height from which the debris is dropped, whichever is the greater. Where material is dropped, a competent look out man shall be posted to ensure safety generally.

220 OWNERSHIP OF PROPERTY ARISING FROM DEMOLITION:
Where materials are or are to become the property of one of the service authorities, the relevant authorities are to be given any necessary facility to disconnect and remove these from the site. Unless noted otherwise, the Contractor shall remove all materials from site and dispose in accordance with all relevant statutory requirements.
Components and materials arising from the demolition work are to become the property of the Contractor except where otherwise provided. Remove from site as work proceeds.

230 WEATHER CONDITIONS:
Before carrying out any part of the work, consider prevailing weather conditions and forecasts, paying particular attention to the effects of adverse wind. When mechanical plant is used for demolition, ensure that no part of the machine comes into direct contact or in close proximity to electricity cables.

240 PLUMBING, ENGINEERING AND ELECTRICAL INSTALLATIONS:
The description of demolishing structures shall be deemed to include sealing off and making safe the mains to the plumbing, engineering and electrical installations. The description of taking out equipment, appliances, ancillaries, fittings and accessories associated with plumbing, engineering and electrical Installations shall be deemed to include disconnection from the associated gutterwork, pipework, ductwork, conduits, cables and the like. All Mechanical/Electrical works must be carried out so that electrical circuits are isolated at the board and padlocked down/tagged before works can proceed. This lock and warning system must meet with ETCI regulations as a suitable means to prevent any equipment or other objects from becoming unintentionally energized. The contractor shall prepare Method Statement and ensure the procedures are enforced for all such operations to ensure the health and safety of all persons.

250 THE SITE:
As indicated on drawings.

260 EXISTING BUILDINGS ON/ADJACENT TO THE SITE:
As indicated on drawings.

270 EXISTING MAINS/SERVICES:
As indicated on drawings – FOR INFORMATION ONLY. The Contractor shall verify the location of all services – below and above ground – before works commence. The Contractor shall carry out the necessary surveys (visual/ Ground Penetrating Radar/ etc) and liaise with the relevant Utility provider to ensure he has a full knowledge of all utilities on the site.

273 SITE INVESTIGATION: A report is included in the tender documents.

276 A HEALTH AND SAFETY FILE for the site/building is available for inspection.

279 ACCESS TO THE SITE:
As indicated on drawings.

282 USE OF THE SITE:
- Do not use the site for any purpose other than carrying out the Works.
- Do not display or permit advertisements to be displayed on site without consent of the CA.
- Refer to the Site Limitations Document and other documents for additional information

285 WORKING AREA:
- The Contractor will be confined to
As indicated on drawings.
- Work in footpaths and roadways adjacent to but beyond the site boundary is to be by agreement with the Local Authority or other relevant agencies and CA / Client. Erect, maintain and remove on completion any necessary extensions of fences and hoardings.

288 SURROUNDING LAND/BUILDING USES:
As indicated on drawings.

291 RISKS TO HEALTH AND SAFETY:

Refer to Site Limitations and Health & Safety Documents.

- 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.

294 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.

THE CONTRACT

310 Refer to Contract Documents

390 HEALTH AND SAFETY INFORMATION: A statement must be submitted with the tender describing the organisation and resources which the Contractor proposes and undertakes to provide to safeguard the health and safety of operatives, including those of subcontractors and of any person who may be affected by the works, inlcuding:
- A copy of the Contractors health and safety policy document, inlcuding risk assessment procedures.
- Accident and illness records for the past five years.
- Records of previous Health and Safety Executive enforcement action.
- Records of training and training policy.

- The number and type of staff responsible for health and safety on this project with details of their qualifications and duties.

MANAGEMENT OF THE WORKS

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

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

430 SUPERVISION:
- Accept responsibility for coordination, supervision and administration of the Works, including all subcontracts.
- Arrange and monitor a programme with each subcontractor, supplier, statutory undertaker and the Local Authority and obtain and supply information as necessary for coordination of the work.
- Allow in the programme for any periods of notice for inspection required by the Local Authority or statutory undertaker.

435 PROGRAMME:
- As soon as possible and before starting work on site prepare in an approved form a programme for the Works, which must make allowance for all:
  - Planning and mobilisation by the Contractor.
  - Subcontractor's work.
  - Work resulting from instructions issued in regard to the expenditure of provisional sums.
  - Work by others concurrent with the Contract.
  - Submit soft copies to the CA.

440 SITE MEETING(S):
- Before commencement of work on site, hold a meeting with the CA, Local Authority, statutory undertakers and other relevant agencies to agree demolition procedures.
- The CA will hold regular site meetings to review progress and other matters arising from the administration of the Contract.

450 SITE INSPECTIONS: The CA will require access to the site at all reasonable times. Agree dates and times of inspections with the CA several days in advance, to enable the CA and other affected parties to be present.

455 ESTIMATED COST OF VARIATIONS: 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.

460 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.

470 LABOUR AND PLANT RECORD: Provide each week for verification by the CA a record showing:

- The number and description of persons employed on the Works on each day of that week, including those employed by subcontractors.
- The number, type and capacity of all mechanical and power operated plant employed on the Works on each day of that week.

SECURITY/SAFETY/PROTECTION GENERALLY

500 THE CONTRACTOR'S HEALTH AND SAFETY PLAN is integral with the Preliminaries and Specification. Commonplace hazards which should be controlled by good management and good site practices are not listed. Specific hazards which may present a risk to the health and safety of demolition workers and others are given elsewhere in the Preliminaries and Specification.

505 THE DEMOLITION PHASE HEALTH AND SAFETY PLAN, developed from the Pre-tender Health and Safety Plan must be submitted to the CA not less than 10 DAYS before the proposed date for start of demolition work. Do not start demolition work until the Employer has confirmed in writing that in his view the Demolition Phase Health and Safety Plan includes the procedures and arrangements required by the **Requirements of the Safety Health and Welfare at Work (Construction) Regulations 2006** or by other Regulations or contract documents. The plan must include:

- Detailed proposals for managing health and safety during the demolition phase together with site rules and emergency procedures.
- Method statements related to the hazards identified in the Preliminaries and Specification and/or statements on how the hazards will be addressed and other significant hazards identified by the contractor.

508 APPROVED CODES OF PRACTICE: Comply with all relevant HSA Publications, including:

- Management of health and safety at work.
- Managing construction for health and safety.

510 SECURITY: Adequately safeguard the site, the Works, products, materials arising, 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.

520 PUBLIC SAFETY:

- Protect the public and occupiers of adjoining property by erection of temporary fences, hoardings, fans, footpaths, warning lights, etc. before starting work.
- Ensure that means of escape from adjoining property in the event of fire are maintained for the duration of the Works.

530 OCCUPIED PREMISES:

- Existing buildings will be occupied and/or used during the Contract as follows: **ALL BUILDINGS ON SITE**
- Carry out the Works without undue inconvenience and nuisance and without danger to occupants and users. Ensure that means of escape in the event of fire are maintained for the duration of the Works.
- If it transpires that compliance with this clause requires certain operations to be carried out during overtime, and such overtime is not required for any other reason, the extra cost will be paid to the Contractor, provided that such overtime is authorised by the CA in advance.

533 EMPLOYER'S REPRESENTATIVES SITE VISITS:
Inform the CA in advance of all safety provisions and procedures (including those relating to materials which may be deleterious) which will require the compliance of the Employer or his representatives when visiting the site. Provide protective clothing and/or equipment for the Employer and his representatives as appropriate.

537 THE HEALTH AND SAFETY FILE: Provide such information as is required by **Requirements of the Safety Health and Welfare at Work (Construction) Regulations 2006** or by other Regulations or contract documents.

PROTECT AGAINST THE FOLLOWING

540 EXPLOSIVES: Do not use.

550 NOISE: The Local Authority has granted consent – Refer to the Planning Conditions
551 NOISE:
- Comply generally with BS 5228.
- Noise levels from the works are to be kept below the dB(A) threshold identified in the Site Limitations Document.
- 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 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.

560 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.

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

580 FIRE: Take all necessary precautions to prevent personal injury, death, and damage to the Works or other property from fire.

590 FLOOD: Ensure that there is no hazardous build up of water. Provide for temporary conveyance and disposal of rainwater from existing structures and the site during the course of the Works.

600 BURNING ON SITE of materials arising from the work will not be permitted.

610 RUBBISH:
- Remove rubbish, debris and surplus material and spoil regularly and keep the site and Works clean and tidy.
- Remove all rubbish, dirt and residues from voids and cavities before filling or closing in.
- Ensure that unwanted non-hazardous material and rubbish is disposed of at a tip approved by the EPA or other relevant statutory body.

- Remove all surplus hazardous materials and their containers regularly for disposal off site in a safe and competent manner as approved by the EPA or other relevant statutory body and in accordance with relevant regulations.
- Retain waste transfer documentation on site.

620 ELECTROMAGNETIC INTERFERENCE: Take all necessary precautions to avoid excessive electromagnetic disturbance of apparatus outside the site.

640 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 services.
- Observe service authority's recommendations for work adjacent to existing services. Do not interfere with their operation without consent of the service authorities or other owners.
- If any damage to services results from the Works notify CA and appropriate service authority without delay. Make arrangements for making good without delay to be to the satisfaction of the service authority or other owner as appropriate.
- Replace marker tapes or protective covers disturbed by site operations to the service authority's recommendations.

650 ROADS 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 the Local Authority or other owner. Bear any costs arising.

660 TREES/HEDGES/SHRUBS/LAWNS: Adequately protect and preserve, except those which are to be removed. Replace to approval or treat as instructed any species or areas damaged or removed without approval.

670 TREES TO BE RETAINED: Unless specified otherwise do not:
- Dump spoil, rubbish or materials within the branch spread.
- Excavate or disturb the topsoil within the branch spread.
- Change level of ground within an area 3 m beyond the branch spread.

680 ADJOINING PROPERTY: Access to/use of adjoining property has been agreed with adjacent owners in association with the CA and Employer.

681 ADJOINING PROPERTY: Prevent trespass of work people. Take all reasonable precautions to prevent damage to adjoining property. Obtain permission as necessary from the owners if requiring to erect scaffolding on or otherwise use adjoining property, and pay all charges. Clear away and make good on completion or when directed. Bear the cost of repairing any damage arising from execution of the Works.

690 MATERIALS FOR REUSE: The phrase '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.

SPECIFIC LIMITATIONS ON METHOD/SEQUENCE/ TIMING

710 METHOD/SEQUENCE OF WORK:
As indicated in Site Limitations Document.

750 WORKING HOURS:
As indicated in Site Limitations Document.

FACILITIES/TEMPORARY WORK/SERVICES

810 GENERAL COST ITEMS: Include for all such items:
- Management and staff
- Site accommodation
- Services and facilities
- Mechanical plant
- Temporary works.

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

830 MAINTAIN, alter, adapt and move temporary works and services as necessary. Clear away when no longer required and make good.

850 TEMPORARY FENCE(S):
As indicated in Site Limitations Document and Drawings.

855 TEMPORARY HOARDING(S):
As indicated in Site Limitations Document and Drawings.

860 TEMPORARY SCREEN(S):
As indicated in Site Limitations Document and Drawings.

865 TEMPORARY SHORING:
TO BE DESIGNED BY CONTRACTOR

870 TEMPORARY FACADE RETENTION SYSTEM:
TO BE DESIGNED BY CONTRACTOR

880 LIGHTING AND POWER:
- The permanent electrical installation may be used by the Contractor, but the Employer does not undertake that it will be available.
- The Contractor must make all arrangements for supply and separate metering of electricity for the works and pay all costs.

890 WATER for the Works will be supplied free of cost to the Contractor. Nature of supply: Existing main.

C11 ALTERATIONS – DEMOLITION OF SPOT ITEMS

GENERALLY

APPLICABILITY: The requirements of this section apply to all alteration work to existing building given as spot items in various parts of the Schedules/Bills.

120 QUALITY OF WORK in spot items to be as described in the relevant other sections of the specification.

130 PRICING ON SITE: The contractor shall be deemed to have visited the site and ascertained the full extent and nature of the alterations.

150 SUPPORT existing structure as necessary during cutting of new openings or replacement of structural parts. Do not remove supports until new work is strong enough to support the existing structure.

155 PROTECTION OF SURROUNDING OR NEIGHBOURING STRUCTURE: Carry out the work, to ensure, as far as possible, that no damage is occasioned to the surrounding or neighbouring structures. The contractor shall, subject the Conditions of Contract, be responsible for the rectification of any such damage.

160 PROTECTION OF BUILDING INTERIORS: Protect building interiors from weather and dust during the course of alteration work with temporary screens of sufficient size to permit execution of new work and to the approval of CA.

165 REMOVING DEFECTIVE MASONRY: Carefully remove one brick/block at a time and ensure that no damage is caused to adjacent masonry which is to remain intact.

170 MAKING GOOD: Unless otherwise stated make good parts and/or finishes of existing structure disturbed during alterations to match existing.

175 REMOVAL OF EXISTING COVERINGS, ETC:
When removing existing coverings or finishings such as timber boarding or roof tiles, take due care not to damage the existing base or roofing tiles, take due care not to damage the existing base or supports and remove all protruding nails leaving existing base/supports prepared to receive new coverings or finishings. Contractor to make good any damage so caused at his own expense.

180 OVERLAPPING OPENINGS: Where a new opening overlaps an existing opening the area of overlapping stated is that which is contained within the nominal finished size of the new opening and excludes any overlap arising from the extra cutting that may be required to accommodate lintels, thresholds, the formation of jambs and the making good of the structure around the openings, etc.

PRODUCTS/MATERIALS ARISING

210 OWNERSHIP: Products and materials arising from the alteration work are to become the property of the Contractor except where otherwise stated. Remove from the site as work proceeds.

220 HARDCORE: Brick rubble or other hard materials arising from the work may NOT be reused as hardcore, subject to compliance with specification and written permission being obtained from CA.

230 INFECTED TIMBER: Where instructed, remove timber affected by fungal/insect attack from the building in a way which will minimise the risk of infecting other parts of the building, and destroy as soon as possible.

280 BURNING ON SITE of materials arising from the work will not be permitted unless written permission is obtained from CA.

290 SETTING ASIDE FOR MEASUREMENT: Where the removal of pipework is measured in the Bill of Quantities, set the pipework aside for measurement by the quantity surveyor before removal from site.

300 REUSE OF FACINGS: The reuse of facings arising from alterations shall only be allowed where permission is given by CA.

400 DISINFECTING EXISTING DWELLINGS
- Chemical preparations to be to satisfaction of CA.
- Thoroughly disinfect dwelling to satisfaction of CA.
  Chemical preparations to be used strictly in accordance with manufacturers instructions.

500 REMOVING INFECTED PLASTER:
- Strip off plaster from walls are found to contain strands of serpula to 600 mm beyond the last visible signs of attack. Dispose of debris immediately.
- Replastering and other builder's work is measured in the appropriate sections.

C20 DEMOLITION OF STRUCTURES

GENERAL REQUIREMENTS

110 SURVEY: Before starting work, examine all available information, carry out a survey of the structure(s), site and surrounding area, and submit a survey report and method statement to the CA covering all relevant matters listed below and in the **Requirements of the Safety Health and Welfare at Work (Construction) Regulations 2006**:
- The form, condition and demolition methods of the structure(s).
- The form, location and removal methods of any toxic or hazardous materials.
- The identification and location of services above and below ground.

120 EXTENT OF DEMOLITION: Subject to the retention of features, facades, structures, retaining walls, etc., specified elsewhere, demolish structure(s) down to suitable ground bearing level or as specified.

130 GROUNDWORKS: Break out old foundations, slabs, etc. where and to the extent stated on the drawings. Remove contaminated earth and disinfect as required by the Local Authority. Backfill with **NRA Clause 804** Type B material.

140 BENCH MARKS: Report to the CA any bench marks and other survey information found on structure(s) to be demolished. Do not remove or destroy unless instructed.

150 FEATURE(S) TO BE RETAINED: The features to be kept in place and adequately protected: as specified on the drawings.

SERVICES AFFECTED BY DEMOLITION

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.

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

231 DISCONNECTION OF SERVICES: The Employer will arrange with the appropriate authorities for the disconnection of services and removal of fittings and equipment prior to demolition as follows:
as specified on the drawings.
Before starting demolition ensure that disconnections have been carried out.

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

250 DRAINS IN USE: Protect drains, manholes, gullies, vent pipes and fittings still in use and ensure that they are kept free of debris at all times. Make good any damage arising from demolition work and leave clean and in working order at completion.

260 BYPASS CONNECTIONS: Provide as necessary to maintain continuity of services to occupied areas of the same and adjoining properties. Give a minimum 72 hours notice to occupiers if shutdown is necessary during changeover.

270 SERVICES WHICH ARE TO REMAIN: Notify the CA and service authority or owner of any damage. Make all arrangements for repair to the satisfaction of the CA and service authority or owner. Bear any costs arising.

DEMOLITION WORK

310 WORKMANSHIP GENERALLY:
- Demolish structure(s) in accordance with **BS 6187** and **Guidelines on the Procurement, Design and Management Requirements of the Safety Health and Welfare at Work (Construction) Regulations 2006**
- Operatives must be appropriately skilled and experienced for the type of work and hold or be training to obtain relevant Certificates of Competence.
- Site staff responsible for supervision and control of the work are to be experienced in the assessment of the risks involved and in the methods of demolition to be used.

320 GAS OR VAPOUR RISKS: Take adequate precautions to prevent fire or explosion caused by gas or vapour.

330 DUST: Reduce dust by periodically spraying demolition works with water.

340 HEALTH HAZARDS: Take adequate precautions to protect site operatives and the general public from health hazards associated with dangerous fumes and dust arising during the course of the Works.

350 ADJOINING PROPERTY:
- When demolishing structure(s) against adjoining property leave adequate temporary support and protection at each stage and arrange for inspection by the CA. Maintain and alter temporary supports and protection as necessary as work progresses.

- Demolish structure(s) causing a minimum of damage to adjoining property and leave no unnecessary or unstable projections.
- Do not disturb support to foundations of adjoining property unless otherwise instructed.
- Report to the CA any defects exposed or becoming apparent in adjoining property.
- Promptly repair any damage caused to adjoining property by demolition work. Make good to ensure safety, stability, weather protection and security.

360 STRUCTURE(S) TO BE RETAINED:
- Adequately protect parts of existing structure(s) which are to be kept in place.
- Cut away and strip out the minimum necessary and with care to reduce the amount of making good to a minimum.
- Prevent debris from overloading any part of the structure which is not to be demolished.

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

380 DANGEROUS OPENINGS: Illuminate and protect as necessary.

400 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.

420 Leave adequate buttress walls or provide temporary support to basement retaining walls up to ground level.
- Make the remaining sections of any retaining and buttress walls safe and secure.
- Make holes in basement floors to allow water drainage or penetration (depending on water table). Provide a hole for every 10 sq m, not less than 600 mm in diameter.

430 FILLING OF BASEMENTS, ETC:
- Leave adequate buttress walls or provide temporary support to basement retaining walls up to ground level.
- Make holes in basement floors to allow water drainage or penetration (depending on water table). Provide a hole for every 10 sq m not less than 600 mm in diameter.
- Remove all organic material and soil from basements and other voids. Fill and consolidate with NRA Clause 804 Type B material.

442 COMPLETION:
- Clear away all debris and leave the site in a tidy condition on completion.
- Grade the site to follow the levels of adjacent areas as agreed with the CA.
- Install new materials to complete all areas of the site as per the original specification.

MATERIALS ARISING

510 OWNERSHIP: Components and materials arising from the demolition work are to become the property of the Contractor except where otherwise provided. Remove from site as work proceeds.

F10 BRICK/BLOCK WALLING

To be read with Preliminaries/General conditions and to comply with the following codes and standards.

I.S. EN 1996 – Eurocode 6: Design of Masonry Structures
I.S. EN 1996-1-1: Common rules for reinforced and unreinforced masonry structures
I.S. EN 1996-1-2: General rules - Structural fire design
I.S. EN 1996-2: Design, Selection of materials and execution of masonry
I.S. EN 1996-3: Simplified calculation methods and simple rules
Other codes or standards referenced herein
Irish Building Regulations

TYPE(S) OF WALLING

100 FACING BRICK:
Type: As indicated
Average compressive strength: 10 N/mm^2
Work size: As indicated.
Mortar: 1:1:6 cement lime sand; coloured as described.
Bond: As indicated.

101 FACING BLOCKWORK:
Type: As indicated
Average compressive strength: 10N/mm^2 with no block from any 10 No. tested having a strength less than 5.6 N/mm^2.
Work size: As indicated.
Mortar: 1:1:6 cement lime sand; coloured as described.
Bond: Stretcher.

162 MEDIUM DENSITY BLOCKWORK:
Blocks in inner leaf of external cavity walls: internal walls and party walls, medium dense, to BS 2028 Type A, natural gravel or crushed stone to BS 882
Average compressive strength: 10N/mm^2 with no block from any 10 No. tested having a strength less than 5.6 N/mm^2.
Work size: 440 x 100 mm
Mortar: 1:1:6 cement lime sand; coloured.
Bond: Stretcher.

163 CONCRETE COMMON BLOCKWORK:
Blocks in outer leaf or external cavity walls: Dense to BS 6073 Type A, , natural gravel or crushed stone to BS 882

Average compressive strength: 10N/mm^2 with no block from any 10 No. tested having a strength less than 5.6 N/mm^2.
Work size: 440 x 100 mm
Mortar: 1:1:6 cement lime sand; coloured.
Bond: Stretcher.

164 CONCRETE COMMON BLOCKWORK:
Blocks below DPC level, dense, to BS 6073 Type A, natural gravel or crushed stone to BS 882.
Average compressive strength: 10N/mm^2 with no block from any 10 No. tested having a strength less than 5.6 N/mm^2.
Work size: 440 x 215 mm
Mortar: 2:1:6 cement lime sand.
Bond: Stretcher.

165 MEDIUM DENSITY BLOCKWORK:
Blocks in inner leaf of external cavity walls: internal walls and party walls, medium dense, to BS 2028 Type A, natural gravel or crushed stone to BS 882
Average compressive strength: 10N/mm^2 with no block from any 10 No. tested having a strength less than 5.6 N/mm^2.
Work size: 440 x 100 mm
Mortar: 1:1:6 cement lime mortar coloured; facework flush pointed both sides.
Bond: Stretcher.

WORKMANSHIP GENERALLY

410 RELATED WORK is specified in the following sections:
F30 Accessories/Sundry items for brick/block/stone walling.
F31 Precast concrete sills/lintels/copings/features.

420 SITE STORAGE: Store bricks/blocks in stable stacks clear of the ground and clearly identified by type, strength, grade, etc. Protect from adverse weather and keep clean and dry.

430 CONDITIONING OF BRICKS:
- Do not use clay bricks or calcium silicate bricks when still warm from the manufacturing process.
- In dry warm weather wet the surfaces of very absorbent bricks slightly to reduce suction. Do not soak.

440 CONDITIONING OF CONCRETE BRICKS/BLOCKS:
- Do not use autoclaved concrete bricks/blocks when still warm from the manufacturing process.
- Do not use nonautoclaved concrete bricks/blocks until at least four weeks after casting.
- Do not wet concrete bricks or blocks before laying; use an approved water retaining admixture in the mortar to counteract suction.

460 MORTAR GROUPS: Where mortar is specified by group number, select any mortar in that group as set out below. Mix proportions are by volume. Use the same mortar throughout any one type of facing work.

Mortar group	1	2	3	4

Cement: lime: sand	1:0-0.25:3	1:.5:4-4.5	1:1:5-6	1:2:8-9
Cement: premixed lime & sand (Proportion of lime to sand given in brackets)	1:3 (1:12)	1:4-4.5 (1:9)	1:5-6 (1:6)	1:8-9 (1:4.5)
Cement: sand & air entrainer	-	1:3-4	1:5-6	1:7-8
Masonry cement: sand	-	1:2.5-3.5	1:4-5	1:5.5-6.5

470 TESTING - MORTAR STRENGTH;
- Have tests carried out to determine compressive strength of mortars listed below. Tests to be carried out in accordance with BS 5628:Part 1, Appendix A.1.
- Submit results to CA immediately they are available.
- A provisional sum for testing is included elsewhere.
- Preliminary tests: Specimens to be prepared at least six weeks before walling commences, using materials from the source(s) from which the site will be supplied . Half of the specimens to be tested at seven days and the remainder at 28 days. For any walling type, if the mean compressive strength of mortar at 28 days is less than the value given below then repeat the tests using either a more suitable sand or the next higher Designation of mortar.
- Site tests: During construction, specimens to be prepared for every 150 sq m of each walling type, or for every storey of the building, whichever is the more frequent. Half of the specimens to be tested at seven days and the remainder at 28 days.
- Mean compressive strength of mortar at 28 days to be not less than the following: AS PER CONTRACT DRAWINGS AND DOCUMENTS.

480 TESTING - CEMENT CONTENT OF MORTAR:
- When instructed by CA, test mortar for walling type(s) F10/ . . . before use, to determine cement content.
- Carry out tests using the BREMORTEST method described in Building Research Establishment Information Paper 8/89, or other equivalent.
- A provisional sum for testing is included elsewhere.

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.

510 OVERHAND LAYING must not be used without approval.

511 OVERHAND LAYING will be permitted subject to compliance with this specification and approval of samples and methods of carrying out the work.

520 ACCURACY: Keep courses level and true to line. Accurately plumb all wall faces, angles and features. Unless otherwise specified, build brickwork/blockwork within the following permissible deviations:

Dimension	Permissible deviation (mm)
Position in plan of any point or specified fair face in relation to the nearest building grid line at the same level	+/-10
Length (unless otherwise defined by adjacent construction):	
Up to 5 m	+/-15
5 to 10 m	+/-20
10 to 20 m	+/-25
Over 20 m	+/-30
Height:	
Up to 3 m	+/-15
3 to 6 m	+/-20
Over 6 m	+/-25
Level of bed joints:	
Up to 5 m long	+/-10
5 to 10 m long	+/-15
Over 10 m long	+/-25
Straightness in any 5 m length	+/-10
Vertically:	
In any 3 m height	+/-10
In o/a height of building exceeding 6 m	+/-20
Thickness:	
Overall thickness of walls or width of piers (subject to the following)	+/-15
Difference in thickness of a wall or width of a pier at any two points 3 m apart	+/-10

521 ACCURACY: Notwithstanding clause 520, comply with any critical dimensions given in Preliminaries clause or on the drawings.

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 1.2 m above another at any time.
- In facework, complete each lift in one period of operation.
- Do not carry up any one leaf more than 1.5 m in one day unless permitted by the CA.

545 LEVELLING OF SEPARATE LEAVES: Bring both leaves of cavity walls to the same level at:
- 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.

560 COURSING: Gauge brick courses four to 300 mm including joints.

561 COURSING: Arrange brick courses to line up with existing work.

580 FROGGED BRICKS: Lay single frogged bricks with frog uppermost; lay double frogged bricks with deeper frog uppermost. In either case completely fill frogs with mortar.

595 LINTEL BEARINGS: Carefully predetermine setting out to ensure that full length masonry units occur below lintel ends.

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

615 BRICKWORK TO RECEIVE ASPHALT DPC: Finish flush with mortar to give a smooth level bed.

620 BLOCK BOND new walls to existing, by cutting pockets into existing walls, not less than 100 mm deep, the full thickness of the new wall, and vertically as follows:
Brick to brick: 4 courses high at 8 course centres.
Block to block: Every other course.
Bond new walling into pockets with all voids filled solid with mortar.

635 JOINTING: When not specified otherwise, finish joints neatly to the specified profile(s) as the work proceeds.

645 UNEXPOSED JOINTS: As the work proceeds, strike off joints that will not be exposed to view in the finished work.

655 JOINTS IN MASONRY TO BE PLASTERED OR RENDERED: Unless keyed units or metal lathing are used, rake out joints as work proceeds, to a depth of approximately 15 mm.

665 POINTING: Where specified, rake out joints to a depth of 12-15 mm as the work proceeds. Subsequently, remove loose debris from the joints using a dry brush, dampen the work, and neatly point to the specified profile in a continuous operation from the top of the wall downwards as the scaffolding is taken down.

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

671 FIRE STOPPING: Ensure a tight fit between brickwork and cavity barriers to prevent fire and smoke penetration.

680 HOLES, RECESSES AND CHASES IN BRICK/BLOCK WALLING: Comply with the relevant clause in section P31.

690 ADVERSE WEATHER:
- Do not use frozen materials.
- Do not lay bricks/blocks when the air temperature is at or below 3 degC unless mortar has a minimum temperature of 4 degC when laid and walling is protected. Do not lay mortar on frozen surfaces.

- Maintain temperature of the work above freezing until mortar has fully hardened.
- Rake out and replace mortar damaged by frost. When instructed, rebuild damaged work.
- Protect newly erected walling against rain and snow by covering when precipitation occurs, and at all times when the work is not proceeding.

ADDITIONAL REQUIREMENTS FOR FACEWORK

710 THE TERM FACEWORK, where used in this specification, applies to all brick/block walls finished fair. Where any facework is to be painted, the only specification requirement to be waived is that relating to colour.

730 SAMPLES: Samples of facing blocks shall be submitted for the approval of the CA and the approved samples shall form the standard for all facing blocks used on the work.

740 REFERENCE PANEL(S): Prepare panel(s) as set out below and, after drying out, obtain approval of appearance before proceeding. Construct panels with randomly sampled bricks/blocks in an approved location.

- Walling type F10/ 110 and 112
  Size of panel: 1200 x 1200
  Including example of cill and jambs
- Walling type
  Size of panel: 1200 x 1200
  Including example of brick bonding
  Including example of different coloured mortars for Architect choice.

750 COLOUR MIXING:

- Agree with manufacturer and CA methods for ensuring that the supply of facing bricks/blocks is of a consistent, even colour range, batch and within batches.
- Check each delivery for consistency of appearance with previous deliveries and do not use if variation excessive.
- Mix different packs and deliveries which vary in colour to avoid horizontal stripes and racking back marks.
- Distribute bricks/blocks or varying colour evenly throughout the work so that no patches appear.

760 APPEARANCE:

- Select bricks/blocks with unchipped arrisses and flat surfaces.
- Set out and lay carefully to give a satisfactory, uniform appearance with joints consistent in colour, width and profile and perpends vertically aligned in alternate courses.
- Cut bricks/blocks only where necessary at jambs and junctions. Cut with a masonry saw where cut edges will be exposed to view.
- Protect facework against damage and disfigurement during the course of the works, particularly arrisses of openings and corners.

780 GROUND LEVEL: Facework to start not less than 150 mm below finished level of external paving or soil except where shown otherwise.

790 PUTLOG SCAFFOLDING to facework will not be permitted.

800 TOOTHED BOND: Except where a straight vertical joint is specified, new and existing facework in the same plane to be bonded together at every course to give a continuous appearance.

820 BRICK SILLS/CAPPINGS: Bed solidly in mortar with vertical joints completely filled. Press mortar firmly into exposed joints and finish neatly.

830 CLEANLINESS: Keep facework clean during construction and until practical completion. Ensure that no mortar encroaches on face when laying. Turn back scaffold boards at night and during heavy rain. Rubbing to remove marks or stains will not be permitted.

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

To be read with Preliminaries/General Conditions

CAVITIES

110 CONCRETE FILL: Fill cavities with concrete up to external ground level and with top sloping towards exterior. Refer to Section E10.

120 CLEANLINESS: Keep cavities, ties and dpcs free from mortar and debris with laths or other suitable means. If, despite these precautions, mortar or debris falls down the cavity:
- Carefully clean cavity trays or dpcs which span the cavity before the mortar sets, taking care to avoid damaging the trays or dpcs; if these are damaged demolition may be required.
- remove all mortar and debris from base of cavity through holes in the inner leaf before the mortar sets. Make good to holes.

130 MORTARS:
- As section Z21

132 WEEP HOLES:
- Form with plastics perpend units to manufacturer's recommendations at 900 mm centres immediately above base of cavity, external openings and stepped dpcs. Provide not less than two weep holes over openings.
- Manufacturer and reference: As indicated

151 CAVITY INSULATION:
- Insulation: to all external walls
  Size to suit wall tie spacings, thickness: As indicated
  Manufacturer and reference: As indicated
- Fix securely with tightly tongued and grooved joints, ensuring that:
- Edges are not damaged
- Top edges are covered with a temporary batten to ensure that they remain completely free of mortar droppings, grout and other debris,
- All parts of the inner leaf cavity face are covered.
- Place and secure each course of insulation before building up inner leaf above level of previous course of insulation. Sample to be provided prior to use for Architect's approval.

153 CAVITY INSULATION:
- Insulation: As indicated ON DRAWINGS
  Size to suit cavities, thickness as indicated ON DRAWINGS
  Manufacturer: As indicated ON DRAWINGS
  Reference: F.R.A. grade HD
- Fix securely with tightly butted joints, ensuring that:
- Edges are not damaged

- Top edges are covered to ensure that they remain completely free mortar droppings, grout and other debris.

212 WALL TIES FOR FIXING TO STEEL: To **IS EN 845-1:2008**., twist type.
Manufacturer and reference: Halfen Fixing Systems Ltd. HT/FS/12/VT/180/225 Tie or equal approved.
Material/Finish: Stainless Steel
Size: **To suit cavity wall as detailed and in accordance with manufacturer's instructions.**
Fixing: bent once: shot fixing to steel one end: building in retention discs for insulation.

213 CHANNEL TIES FOR CASTING INTO CONCRETE:
Manufacturer and reference: Halfen Fixing Systems Ltd.; 38/17 HTA
Material/finish: stainless steel

214 SITE DRILLED FIXING BOLTS:
Manufacturer and reference: Halfen Fixing Systems Ltd.; DEB 12
(M8 12 mm diameter)
Material/finish: stainless steel
Fixing: to blockwork

215 SITE DRILLED FIXING BOLTS:
Manufacturer and reference: Halfen Fixing Systems Ltd.; DEB 18
(M12 18 mm diameter)
Material/finish: stainless steel with plate washer
Fixing: to stainless steel

REINFORCING/FIXING ACCESSORIES

210 WALL TIES FOR USE IN INSULATED CAVITY WALLS
Special formed off-set vertical twist (offset to incorporate plastic retaining insulation clip) to conform to B.S. 1243, 1978, B.S. 5628. Part 3 Clause 19.5 and in accordance with Table 9. Off-set to be centred on air gap.
Material/finish: Austenitic stainless steel also complying with B.S. 1449 Part 2 and B.S. 970 Part 4, minimum 18/8 composition and excluding free machine specification.
Minimum tensile strength 510 N/mm^2. Minimum thickness 3.00 mm and not exceeding 4.83 mm.
Overall size: **To suit cavity wall as detailed and in accordance with manufacturer's instructions.** Permissible deviations± 5 mm. Sample of wall tie to be provided prior to use for C.A. approval.

230 FIXING CAVITY WALL TIES:
- Bed not less than 50 mm into bed joint of each leaf.
- Slope towards the exterior with drip centred on air cavity.
- Evenly space at 750 mm centres horizontally, staggered in alternative courses, and at 450 mm centre vertically, unless specified otherwise.
- Provide additional ties within 225 mm of sides of openings, at not more than 300 mm centres

240 ASBESTOES – FREE MINERAL FIBRE BOARD CAVITY CLOSER:
- Material: Asbestos free mineral fibre cement board.
- Fixing: Bed in cement mortar to match walling.

FLEXIBLE DAMP PROOF COURSES/CAVITY TRAYS

320 POLYETHLYENE DAMP PROOF COUSE
To B.S. 6515
Manufacturer and reference: BLC polythene damp proof course (embossed) of approved manufacture, e.g. Hyload weighing not less than 0.48 kg/m^2 or SIMILAR APPROVED. Sample to be provided prior to use for Architect's Approval.

380 GROUND LEVEL HORIZONTAL DPCS: Lay on a thin even bed of fresh mortar in a continuous strip with 100 mm laps at joints and full laps at angles. Immediately bed next course of masonry on a thin even bed of fresh mortar and finish joint to normal thickness.

390 VERTICAL DPCS to be in one piece wherever possible. Otherwise overlap by not less than 100 mm with upper piece outermost.

400 JAMB DPCS: Ensure that dpcs to jambs of openings:
- Project not less than 25 mm into cavity.
- Are in full contact with frame.
- Fully lap over horizontal dpc at sill and behind cavity tray/lintel at head.

401 JAMB DPCS: Fix to back of timber frames which are to be built in, using galvanised clout nails or staples.

410 SILL DPCS to be in one piece and bedded in the mortar specified for the sill.

420 COPINGS/CAPPING DPCS to be bedded in the mortar specified for the coping/capping units.

490 CAVITY CASCADE SOAKERS AT ABUTMENTS:
- Manufacturer: Hyload or SIMILAR APPROVED.
- Materials: Galvanised steel and lead.
- Fixing: building in as work proceeds.

510 CAVITY TRAYS FORMED IN-SITU: Dpcs which span cavities to prevent the downward ingress of water to be:
- Accurately formed to the profiles shown on drawing and firmly secured.
- In the maximum possible unjointed lengths
- Fully supported over cavity, when horizontal, by a cavity closer.
- Fixed tightly across the cavity so they do not sag when stepped..
- Lapped 100 mm and sealed at joints using adhesive/mastic/torching in accordance with manufacturer's recommendation to ensure a fully watertight installation.
- Carefully cleaned to remove mortar (before it sets) and other debris.
- Carefully protected from perforation and other damage.

520 CAVITY TRAYS OVER OPENINGS to extend not less than 100 mm beyond ends of lintels.

550 JUNCTIONS FORMED IN-SITU:
- Where preformed junction cloaks are not specified or shown on drawing, form all three dimensional changes of shape in dpcs and/or cavity trays carefully and neatly to ensure a fully watertight installation, using folds wherever possible to achieve the required shape.
- Seal all laps using adhesive/mastic/torching in accordance with manufacturer's recommendations.
- Preformed junction cloaks may be used in lieu, subject to approval.

581 FACEWORK: Keep leading edge of dpcs/cavity trays 5 mm back from face of wall in all locations.
Rake back mortar to fully expose edge of dpc/cavity tray.

JOINTS

620 CONTRACTION JOINTS IN FACEWORK:
- Build in an approved fibreboard or cork joint filler as the work proceeds ensuring no projections into cavities. In joints to be pointed with sealant, position filler accurately at the recommended distance from face of wall. Leave joints open for as long as possible before sealing.
  Sealant: Expandite Thioflex – One
  Colour to suit F10
- Prepare joints and apply sealants as section Z22.

650 POINTING IN FLASHINGS: Remove dust, lightly wet and neatly point with mortar specified for walling. Ensure joint is completely filled and finish flush.

650 PINNING UP TO SOFFITS: Completely fill joint at top of loadbearing walls with mortar, well rammed into position using temporary shuttering.

670 TOPS OF NONLOADBEARING WALLS:
- Restraint: 50 x 50 continuous softwood softwood battens fixed to 600 centres with 14 gauge screws
- Joint filler: Rockwool packing
- Securely fix restraints to soffit leaving no gaps to ensure compliance with design requirements.

PROPRIETARY SILLS/LINTELS/COPINGS/DRESSINGS

THE CONTRACTOR SHALL SUBMIT WRITTEN IMFORMATION FOR THE DESIGN, FABRICATION AND INSTALLATION OF **ALL LINTELS** (PRECAST CONCRETE, COMPOSITE STEEL or otherwise) FOR THE APPROVAL OF THE ENGINEER BEFORE WORKS COMMENCE. THE SUBMITTAL SHALL CLEARLY DEMONSTRATE THE PROPOSED LINTELS ARE APPROPRIATELY SIZED FOR ALL LOADING CONDITIONS. THE LINTEL MANUFACTURER SHALL PROVIDE STRUCTURAL CALCULATIONS AND TEST DATA TO DEMONSTRATE THE ABILITY OF THE LINTELS TO TRANSFER ALL REQUIRED LOADS. THE CALCULATIONS SHALL INCLUDE THE ANTICIPATED DEFLECTION UNDER EACH LOADING CONDITION.

ALL DESIGN AND INSTALLATION SHALL COMPLY WITH IS EN 1996 – EUROCODE 6: DESIGN OF MASONRY STRUCTURES AND THE RELEVANT PARTS OF IS EN 1992 AND IS EN 1993.

730 PRECAST CONCRETE LINTELS: For use in internal openings at 150 mm wall.
- To B.S. 5977: Part 2
  Manufacturer and reference: Killeshal Precast, Daingean, Co. Offaly, Ireland or equal approved.
- Bed on mortar used for adjacent work with bearing of not less than 150 mm unless specified otherwise. Use slate packing pieces.

760 PREFABRICATED STEEL LINTELS:
- To B.S. 5977: Part 2, 1983.
  Manufacturer and reference: STEELITE Ltd, Rathangan, Co. Kildare

Or equal approved.
Material/finish: Z1 Grade galvanised steel to B.S. 2989 1982 with zinc coating type (H3) giving minimum zinc coating of 600 g/m^2 including both sides. All edges to be treated with chlorinated rubber paint.
'U' value 0.4 W/m^2/degrees C.

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

MISCELLANEOUS ITEMS

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

G12 ISOLATED STRUCTURAL METAL MEMBERS

To be read with Preliminaries/General conditions.

110 FABRICATION OF MEMBERS:
- Steel sections: To BS 4: Part 1 or BS 4848 as appropriate, made from steel to BS EN 10025, grade S275.
- Do not use sections which are heavily pitted or rusted.
- Make cuts and holes neatly and accurately. Remove burrs, sharp edges and dross caused by flame cutting.
- Welding: Metal arc method to BS 5135 to form fully fused joints with mechanical properties not less than those of the parent metal. Do not weld on site.

150 SHOP PRIMING AS ABOVE
- Cleaning: Chip, scrape, disc sand and grind surfaces to remove all fins, burrs, sharp edges, weld spatter, loose rust and loose scale. Clean out all crevices. Thoroughly degrease using emulsion cleaners followed by thorough rinsing with water. Apply primer when surface is dry and on the same day as cleaning.
- Primer: One full coat of zinc phosphate modified alkyd brush applied to all surfaces, free from runs and sags.

310 INSTALLATION:
- Position members accurately, using steel packs of adequate area as necessary to achieve a true line and level.
- Fix securely using washers under bolt heads and nuts.
- Use suitably tapered, correctly aligned washers under bolt heads and nuts which bear on sloping surfaces.
- Bolts: AS ABOVE

G20 CARPENTRY/TIMBER FRAMING/FIRST FIXING

To be read with Preliminaries/General conditions.

GENERAL REQUIREMENTS/INFORMATION

Specification for new Science & Technical Graphics Rooms, Toilet Area and all associated works at Halla Lydia, St Dominic's College Cabra, Ratoath Road, Ashdown, Dublin 7.

To be read with Preliminaries/General conditions and to comply with the following codes and standards where applicable.

EN 1995 – Eurocode 5: Design of Timber Structures
I.S. EN 1995-1-1: General - Common rules and rules for buildings
I.S. EN 1995-1-2: General - Structural fire design
Irish Building Regulations
Other codes or standards referenced herein

110 BASIS OF DESIGN:

- The structural timber work shown on the drawings and described in this specification has been designed to EN 1995 – Eurocode 5: Design of Timber Structures and I.S. EN 1995-1-1 where applicable, unless stated otherwise.
- Complete the design and detailing of the work to I.S. EN 1995-1-1to satisfy loading requirements specified or otherwise calculable from the information given.

120 DRAWINGS, ETC. must show:

- Geometry of structure
- Timber species, and grades, or strength classes
- Target/finished sizes of all structural timber sections
- All joints not detailed on Engineer's drawings, their locations, and evidence as to their structural adequacy.

130 PROTOTYPE TESTS: Approval will be given to contractor- designed structures that are not amenable to calculation in accordance with BS 5268:Part 2 provided that they comply with design requirements when tested to BS 5268: Part 2, Section 8.

150 STRENGTH GRADING OF TIMBER:

- To be carried out by companies currently registered under a third party quality assurance scheme operated by any of the certification bodies approved by the UK Timber Grading Committee.
- Timber of a basic thickness less than 100 mm and not specified for wet exposure to be strength 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 wet exposure conditions to be clearly marked as 'WET' or 'GRN'.
- Structural timber members cut from large graded sections to be regraded to approval and marked accordingly.

TYPE(S) OF TIMBER

210 GRADED SOFTWOOD FOR STRUCTURAL USE GENERALLY

- Stress graded to B.S. 4978 or other national equivalent and so marked.
  Strength class to B.S. 5268: Part 2: SC3.
  Surface finish: Sawn generally. Regularised for ceiling joists.
- Preservative treatment: As section Z12 and British Wood Preserving Association Specification C8
  Type/desired service life: CCA 40
- Moisture content at time of erection: As clause 450.

230 GRADED SOFTWOOD FOR INTERNAL NON-STRUCTURAL USE

- Stress graded to the appropriate standard or rules for the specified grade and so marked.

Species and origin: Whitewood
Grade: G5/M50
Surface finish: Sawn generally. Regulated.
- Preservative treatment: As section Z12 and British Wood Preserving Association Specification C8
Type/desired service life: CCA 40
- Moisture content at time or erection: As clause 450.

270 UNGRADED SOFTWOOD
- Free from decay, insect attack (except pinhole borers) and with no knots wider than half the width of the section.
- Surface finish: Regularised as Clause 410
- Preservative treatment: As section Z12 and British Wood Preserving Association Specification C8
Type and desired service life: CCA 40
- Moisture content at time of erection: as clause 450.

275 UNGRADED SOFTWOOD
- Free from decay, insect attack (except pinholes borers) and with no knots wider than half the width of the section
- Surface finish: Planed
- Preservative treatment: As section Z12/110
- Moisture content at time of erection: as clause 450.

310 PLYWOOD
- Manufactured to the relevant national standards and quality control procedures specified in BS 5268: Part 2, and so marked.
Type: As indicated on the drawings
Grade: exterior grade plywood to BS EN 636 service class 3
Nominal thickness/number of plies: As indicated on the drawings
Finish: As indicated on the drawings
- Preservative treatment: As section Z12 and British Wood Preserving and Damp-proofing Association Commodity Specification C
Type and desired service life: 50 years

320 HARDBOARD
To BS 1142, Type THE.

350 TRUSSED RAFTERS:
- Designed and fabricated to BS 5268:Part 3.
Manufactured by a firm currently registered under a third party quality assurance scheme.
- Truss system: As indicated on the drawings
- Types/weights of roofing/insulation/ceiling materials:
As indicated on the drawings
- ALL Ancillary components to be supplied by the truss fabricator.

- Trussed rafter treatment: As indicated on the drawings

WORKMANSHIP GENERALLY

401 CROSS SECTION DIMENSIONS OF STRUCTURAL SOFTWOOD AND POPLAR TIMBER:
- Dimensions on drawings are target sizes as defined in BS EN 336.
- The tolerance indicators (T1) and (T2) specify the maximum permitted deviations from target sizes as stated in BS EN 336, clause 5.3:
  Tolerance class 1 (T1) for sawn surfaces
  Tolerance class 2 (T2) for planed surfaces.

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

403 CROSS SECTION DIMENSIONS OF STRUCTURAL AND NONSTRUCTURAL HARDWOOD TIMBER:
- Dimensions on drawings are finished sizes.
- Maximum permitted deviations from finished sizes to be as stated in BS 5450:
  Clause 6.1 for sawn sections
  Clause 8.3 for further processed sections.

420 WARPING OF TIMBER:
The amount of bow, spring, twist and cup in a piece of timber of specified grade must not exceed the limits set down in BS 4978 or BS EN 519 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.
- 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:
Covered in generally unheated spaces: 24%
Covered in generally heated spaces: 20%
Internal in continuously heated spaces: 20%

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

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.

520 SEAL exposed end grain of the all timber with Cuprinol wood preservative before delivery to site.

530 PAINTED FINISHES: Structural timber which is to be painted to be primed as specified before delivery to site.

540 CLEAR FINISHES: Structural timber which is to be clear finished to be kept clean and first coat of specified finish applied 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: Where not specified otherwise, select fixing and jointing methods and types, sizes and spacings of fasteners in compliance with section Z20. Fasteners to comply with relevant British Standards.

580 FRAMING ANCHORS:

- Manufacturer and reference (s): Bat Building and Engineering products Ltd or equal equivalent
  Material/finish: Hot dipped mild steel galvanised to B.S. 2989 Z2 Class C.
- Fix anchors securely using not less than the number of nails recommended by the anchor manufacturer.
- Nails to be not less than 30 x 3.75 mm galvanised or sheradised square twist unless recommended otherwise.

590 METAL PLATE FASTENERS/GUSSETS:
Manufacturer and reference:

600 BLACK BOLTS AND NUTS:
To BS EN 20898.
Finish (applied by manufacturer): as clause 670.

610 BLACK CUP AND COUNTERSUNK HEAD BOLTS AND NUTS:
To BS 4933.
Finish (applied by manufacturer): as clause 670.

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

625 STAINLESS STEEL BOLTS, NUTS AND WASHERS:
- Bolts and nuts: To BS 6105, with washers of matching material.

630 BOLTED JOINTS:
- Locate holes accurately and drill to diameters as close as practical to the nominal bolt diameter and not more than 2 mm larger.
- Place washers under all bolt heads and nuts that would otherwise bear directly on timber. Use spring washers in locations which will be hidden or inaccessible in the completed building.
- Tighten bolts so that washers just bite the surface of the timber. Ensure that 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.

640 BOLTED JOINTS WITH CONNECTORS:
- Connectors: To BS 1579, type(s) and size(s) as shown on drawings.

- Set out with centres of bolt holes not more than 2 mm from specified positions. Assemble joints without crushing timber, deforming washers or overstressing bolts.

670 ANTICORROSION FINISH(ES) FOR FASTENERS:
- To BS 729 for galvanizing, with internal threads tapped and lightly oiled following treatment.
- To BS 4921, Class 1 for sherardizing.
- To BS 7371:Part 3 and passivated, for zinc plating.
- Where no particular treatment is specified, select from the above to suit service conditions.

ERECTION AND INSTALLATION

710 PROPOSALS FOR ERECTING STRUCTURAL TIMBER: At least 10 working days before starting erection of timber structure, submit details of:
- Method and sequence of erection.
- Type of craneage.
- Temporary guys and bracing proposed for use during erection.

740 PRE-ERECTION CHECKING:
- Not less than 10 working days before proposed start date, check foundations and other structures to which timber structure 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.

750 MODIFICATIONS/REPAIRS:
- Inform CA of any defects due to detailing or fabrication errors.
- Obtain approval of proposed methods of rectification before starting modification or remedial work.
- Timber members/components may be rejected if, in the opinion of the CA, the nature and/or number of defects would result in an excessive amount of site repair.

760 TEMPORARY BRACING: Provide 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.

775 BEARINGS:
- Timber surfaces which are to transmit loads to be finished to ensure close contact over the whole of the designed bearing area.
- Packings, where necessary, to cover the whole of the designed bearing area, to have a crushing strength not less than the timber being supported and, in external locations, to be rot and corrosion proof.

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 3 m 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 50 mm 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 6 mm 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.

790 JOIST HANGERS FOR
- To BS 6178:Part 1, size and type to suit joist, design load and crushing strength of supporting construction.
  Manufacturer and reference: Approved type and manufacture
  Material/finish: Galvanised 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 25 mm wider than general joists.

800 TRUSSED RAFTERS:
- Carefully inspect each truss before erection to ensure compliance with shop drawings and specification, including:
  Grades and sizes of members
  Types, sizes and positions of nail plates
  Gaps between ends of members at joints
  Full penetration of nails.
- Erect trusses plumb, at equal centres not exceeding designed spacing and in accordance with BS 5268:Part 3, clause 30 and Appendix B.
- Do not use damaged trusses and do not modify without approval.
- Fix securely with truss clips ensuring that rafters do not bear on wall plates.
- Do not fix ceiling chords to internal walls until roofing is complete and cisterns installed and filled.

805 TRUSS CLIPS:
-Manufacturer and reference: Bat Building and Engineering Products Ltd or equal equivalent.
Material/finish: Hop dipped mild steel galvanised to B.S. 2982 1975 Class Z2.
- Fix securely with 32 x 3.5 mm galvanized or sherardized square twisted nails in every hole.

810 PERMANENT BRACING OF TRUSSED RAFTERS:
- Set out as shown on drawings unless approved otherwise.
- Fix bracing and binders to every rafter, strut or tie with not less than two 75 x 3.35 mm galvanized round wire nails.
- Any lap joints must be side by side extending over and nailed to at least two truss members.
- Where a binder crosses a brace, interrupt and plate the binder.

820 VERTICAL RESTRAINT STRAPS:
-Manufacturer and reference: Bat Building and Engineering Products Ltd or equal equivalent.
Material/finish: Hop dipped mild steel galvanised to B.S. 2982 1975 Class Z2.
Size: Not less than 30 x 5 x 100 x 900 mm long or as shown on the Engineer's drawings.
- Position at not more than 900 mm centres and fix securely to timber plate with not less than two 30 x 3.75 mm galvanised or serialised nails and to masonry with 50 mm x 12 gauge serialised screws evenly plugged to wall.

830 LATERAL RESTRAINT STRAPS:
-Manufacturer and reference: Bat Building and Engineering Products Ltd or equal equivalent.
Material/finish: Hot dipped mild steel galvanised to B.S. 2982 1975 Class Z2.
Size: Not less than 30 x 5 x 150 x 1050 mm long
- Position at not more than 900 m centres and as shown on drawing.
- Ensure that cranked end is in tight contact with cavity face of wall inner leaf and is not pointing upwards.
- Fix noggings and packs beneath straps which span joists/rafters/ties running parallel to wall. Noggings and packs to fit tightly and be not less than three quarters of joist/rafter/tie depth. Notch joists so that straps fit flush with surface. Do not notch rafters/ties.
- Fix straps to joists/rafters/ties with not less than four 50 mm x 8 gauge sheradised countersunk screws, evenly spread.

835 FIXING BRACKETS:
- Material/finish: Galvanised steel.
- Fix securely to timber frame with one 30 mm x 8 gauge galvanised screw and to masonry with two 50 mm x 8 gauge galvanised screws.
- Fixing brackets to comply with B.S. 1599: 1960

840 BOLTS
- Bolts and nuts shall comply with B.S. 4190.
- Washers shall comply with B.S. 4320.

850 EXPANDING BOLTS:

- Expanding bolts shall be Grade A4 stainless steel and shall be of a type to suit the purpose for which they are required.
- Fix security in position in accordance with manufacturers instructions.

875 RETAINING STRAP:
- Material/finish: Galvanised steel.
- Fix securely to timber with 50 mm x 8 gauge galvanised screws.

880 MULTI-GRIP FRAMING ANCHORS:
- Material/finish: Galvanised steel.
- Thickness: 18 gauge
- Fix securely to timber.

881 TREATING ENDS OF STRUCTURAL TIMBERS PRIOR TO BUILDING INTO MASONRY:
- Ends of timbers to be treated as G20/440.

882 MORTAR:
- As Z21
- Mix: Cement lime sand (1:1:6)

883 STRUTTING:
- Unless specified otherwise, securely fix strutting between joists as follows:
  Joist spans of 2.5 to 4.5 m: One row at centre span.
  Joist spans over 4.5 m: Two rows equally spaced.
- Unless specified otherwise strutting to be one of the following:
  Herringbone strutting, at least 38 x 38 mm softwood and located clear of top and bottom edges.
  Solid strutting, at least 38 mm thick softwood and at least three quarters of depth of joist.
  Proprietary metal strutting SUBMIT FOR THE APPROVAL OF THE ARCHITECT -
  Outer joists to be blocked solidly to perimeter walls.

884 INSPECTION: Give CA reasonable opportunity to inspect structural timberwork before covering up.

885 BOLTED JOINTS: Inspect all accessible bolts at the end of the Defects Liability Period and tighten if necessary.

900 EAVES SOFFIT VENTILATORS:
- Manufacturer and reference: Glide or similar To Architect's Approval
  Type: As Indicated
  Colour: As Indicated
- Fix ventilators in accordance with manufacturer's recommendations to provide the equivalent of a continuous opening of not less than 10 mm for full length of eaves.
- Ensure that ventilators are not blocked by insulation at eaves.

950 FASCIAS/BARGES/SOFFITS:
- Manufacturer and reference(s): To Architect's Approval
  Material: As Indicated
  Finish: As Indicated
  Colour: As Indicated
  Nominal depth(s) As indicated 205mm – 560mm SOFFIT
  Edge profile: To Architect's Approval

Accessories: To Architect's Approval
Other requirements: To Architect's Approval
- Support timber: As Indicated
  Provide additional support at joints.
- Fixings: To manufacturer's recommendations
- Installation to be carried out by a contractor approved by the system manufacturer.

H71 LEAD SHEET COVERINGS/FLASHINGS

To be read with Preliminaries/General conditions.

TYPE(S) OF LEADWORK

To be read with Preliminaries/General Conditions

220 PITCHED LEAD VALLEY LINING:
- Underlay: Reinforced polyester – Polyamide based slates felt to B.S. 747 type 1F.
- Lining: Code 5 lead in length not exceeding 2000 mm with laps of not less than 175 mm.
- Fixing: Dress lead sheet over, and beyond, tilting fillets and welt edges. Nail top edge of each sheet and top third of both sides at 150 mm centres. Dress bottom edge neatly into gutter.

250 SOAKERS AT ABUTMENTS:
- Lead: Code 3 cut and dressed to shape for fixing by roofer.
- Dimensions: 175 x 175 x 174 mm upstand.
  Length: Slate/tile gauge + lap + 25 mm.
  Upstand: Not less than 75 mm.
  Underlap: Not less than 100 mm.

310 APRON FLASHINGS TO CHIMNEYS:
- Lead: Code 4 in lengths not exceeding 2000 mm.
- End to end joints: Laps of not less than 100 mm.
- Cover: Not less than 175 mm
- Fixing: Secure bottom edge with tacks at joints at 75 mm centres.

320 COVER FLASHINGS
- Lead: Code 4 in lengths not exceeding 1500 mm.
- End to end joints: Laps of not less than 100 mm.
- Cover: Not less than 100 mm
- Fixing: Welt top edge 12 mm, turn 20 mm into groove and wedge at 600 centres.

Lap upstand by not less than 100 mm and secure bottom edge with lead clips at 600 mm centres.

330 STEPPED COVER FLASHINGS TO ABUTMENTS
- Lead: Code 5 in lengths not exceeding 2000 mm.
- End to end joints: Laps of not less than 100 mm.
- Cover: Not less than 65 mm
- Fixing: Lead wedges at every course.

340 STEP AND COVER FLASHINGS
- Lead: Code 5 in lengths not exceeding 2000 mm.
- End to end joints: Laps of not less than 100 mm.
- Cover: Not less than three quarters of the width of a full tile/slate.
- Fixing: Lead wedges at every course and clips as clause 720 at not more than 500 mm centres along the free edge..

460 COMBINED LEAD DAMP PROOF COURSE/CAVITY TRAY AND COVER FLASHINGS:
- Code 4 coated with high-build, bitumen based paint only on the surfaces which are to be embedded.
  Length of each piece to be not more than 1500 mm.
- Cover of flashing: Not less than 1500 mm.
- Joints: Generally: Lap not less than 100 mm.
  Where the lead spans a cavity: Leadburned within wall.
- Lay on a thin even bed of wet mortar. Without delay bed next layer of overlying construction and finish joint neatly.
- Fixing cover flashing: Fix to lead upstands with clips at laps and at 500 mm centres.

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 INSITU LEADWELDING: will not be permitted.

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

520 LAYOUT: agree setting out of joints, drips, and laps with the CA before beginning work.

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 blowholes. Thickness(es) as BS 1178 but with a tolerance of B10%.

560 EXISTING LEAD TO BE RETAINED: Thoroughly clean by washing with a detergent solution using a stiff brush. If necessary, use a 5% nitric acid solution to remove stubborn deposits. Ensure that the run off does not have an adverse effect on other materials.

580 REPLACEMENT OF EXISTING LEAD must be carried out in small sections at a time to reduce the risk of weather damage to a minimum. Provide and maintain temporary waterproof coverings to ensure that there is no damage to the existing base and building.

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.

630 PLYWOOD UNDERLAYMENT:
- To **BS 6566**, or other equal and approved national standard, WBP bonding, 6 mm thick, sheet size 1200 x 1200 mm.
- Ensure that existing boards are securely fixed and acceptably level. Remove or fill any gross irregularities.
  Punch in any protruding fastenings.
- Lay sheets with cross joints staggered and a 0.5 to 1 mm gap between boards.
- Fix with 24 mm annular ring shank copper or stainless steel nails, at 300 mm grid centres over the area of each sheet and at 150 mm centres along edges, set in 10 mm from perimeter edges.
- Ensure that fastenings are driven well in, with heads set flush with 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

710 HEAD FIXING LEAD SHEET:
- Where not specified otherwise, secure top edge of lead sheets 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.

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 20 mm, shank diameter not less than 3.35 mm and head diameter not less than 8 mm, or
Stainless steel (austenitic) clout nails with annular ring, helical ring or serrated shank, length not less than 19 mm, shank diameter not less than 2.65 mm and head diameter not less than 8 mm.

- 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 19 mm and diameter not less than 3.35 mm, with washers of the same material and plastics plugs of length and diameter to suit screws.

720 CLIPS: Of the type specified, 50 mm wide where not specified to be continuous, length to suit detail:

- Lead, cut from sheets of the same code as the sheet being secured, or
- Copper, cut from .7 mm thick sheet to B.S. 2870, temper grade 1/4H, dipped in solder if exposed to view, or
- Stainless steel, cut from 28 gauge sheet to B.S. 1449: Part 2, grade 304, terne coated if exposed to view.

Unless specified otherwise fix with two fastenings not more than 50 mm from edge of lead sheet. Clips welted around edges of sheets to be turned over 25 mm.

725 CONTINUOUS CLIPS FOR CROSS JOINTS IN ROOFING:

- Lead continuous clips, 50 mm wide, to be cut from sheets of same code as sheet being secured.
- Leadwelded top edge of clips to underlap sheet, 50 mm from lower edge of overlap. Welt edge of overlap lead sheet around continuous clip and dress down.

730 WOOD CORED ROLL JOINTS WITHOUT SPLASH LAP:

- Core: 45 x 45 mm rounded timber as clause 650 tapering to a flat base 25 mm wide. Fix to base with brass or stainless steel countersunk screws at not more than 300 mm centres.
- Dress undercloak half way around core.
- Fix copper or stainless steel clips as clause 720, to the roll at not more than 450 mm centres. Ensure that clip fixing does not restrict thermal movement of the undercloak.
- Dress overcloak around core with edge welted around ends of clips, finishing 5 mm clear of main surface.

740 WOOD CORED ROLL JOINTS WITH SPLASH LAP:

- Core: 45 x 45 mm rounded timber as clause 650 tapering to a flat base 25 mm wide. Fix to base with brass or stainless steel countersunk screws at not more than 300 mm centres.
- Dress undercloak three quarters around core and fix with nails at 150 mm centres for a distance of about one third the length of the panel starting from the head of the sheet.
- Dress overcloak around core and extend on to main surface to form a 40 mm splash lap.

750 HOLLOW ROLL JOINTS:

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

770 WELTED JOINTS:

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

775 STANDING SEAM JOINTS:

- Form with a 100 mm overlap, 75 mm underlap and copper or stainless steel clips as clause 720 at not more than 750 mm centres.
- Welt overlap and clips around underlap, loosely turn over to form a standing seam of consistent cross section.

780 DRIPS WITH SPLASH LAPS:
- Dress underlap into rebate along top edge of drip and fix with one row of nails at 50 mm centres on centre line of rebate.
- Dress overlap over drip and form a 40 mm splash lap.

781 DRIPS WITH SPLASH LAPS:
- Dress underlap up full height of drip upstand. Fix to lower level base with two rows of nails 25 mm and 50 mm from face of drip, at 75 mm centres in each row, evenly spaced and staggered. Seal over nails with a soldered or leadwelded dot.
- Dress overlap over drip and form a 75 mm splash lap. Secure with lead clips as clause 720, leadwelded to underlap, with not less than one per bay.

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

810 FORMING OF DETAILS may be by bossing or leadwelding except where bossing is specifically required.
- Leadwelded seams must be neatly and consistently formed. Do not undercut or otherwise reduce the thickness of the sheets at seams. Filler strips are to be of the same composition as the sheets being joined. Butt joints are to be formed to a thickness one third more than the sheets being joined. Lap joints are to be formed with 25 mm laps and two loadings to the edge of the overlap.
- Bossing must be carried out without thinning, cutting or otherwise splitting the lead sheet.

820 WEDGE FIXING INTO JOINTS/CHASES:
- Carefully rake out joint/chase to a depth of not less than 25 mm.
- Dress lead into joint/chase and fix with lead wedges at not more than 450 mm 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.

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

840 SCREW FIXING INTO JOINTS/CHASES:
- Carefully rake out joint/chase to a depth of not less than 25 mm.
- Dress lead into joint/chase and up back face. Fix 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.
- Prepare joint and apply sealant as section Z22.

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

H72 ALUMINIUM STRIP/SHEET COVERINGS/FLASHINGS

To be read with Preliminaries/General conditions.

TYPE(S) OF ALUMINIUM WORK

AS PER ARCHITECT'S DRAWINGS

GENERAL REQUIREMENTS/PREPARATORY WORK

510 WORKMANSHIP GENERALLY:
- Comply generally with CP 143:Part 15 unless specified or agreed otherwise.
- Fabricate and fix aluminium coverings/flashings to provide a secure, free draining and completely weatherproof installation.
- Operatives must be trained in the application of aluminium coverings/flashings. Submit records of their experience to the CA on request.
- Measure, mark, cut and form aluminium prior to assembly wherever possible.
- Mark out aluminium with pencil, chalk or crayon. Do not use scribers or other sharp instruments without approval.
- Fold coverings/flashings with mechanical or manual presses to give straight, regular and tight bends, leaving panels free from ripples, kinks, buckling and cracks. Use hand tools only for folding details that cannot be pressed.
- Use in situ welding only with approval and subject to completion of a 'hot work permit' and compliance with its conditions.
- Aluminium surfaces to be embedded in concrete or mortar must be fully coated with high build bitumen based paint, after folding.
- Fold under or remove any sharp metal edges as work proceeds.
- Do not use sealants in joints to attain waterproofing.
- Ensure that finished aluminium work is fully supported, adequately fixed to resist wind uplift but also able to accommodate thermal movement without distortion or stress.
- Ensure that finished aluminium work is protected against staining, discolouration and damage by subsequent works.

520 ALUMINIUM STRIP/SHEET:
- To BS EN 485, BS EN 515 and BS EN 573. Stamped or labelled with alloy designation, temper, finish and thickness as specified.
- Manufacturer and reference: To Architect's Approval.

535 INTEGRITY OF ALUMINIUM:
- Design aluminium coverings/flashings and methods of attachment to prevent loss of weatherproofing and permanent deformation due to wind pressure or suction.
- Calculate wind loads in accordance with BS 6399:Part 2.

550 LIGHTNING PROTECTION:
Electrical continuity between aluminium strips/sheets must be provided via welting of joints.

555 LAYOUT: Agree setting out of longitudinal and cross joints with the CA before beginning work.

560 CONTROL SAMPLE(S): Complete areas of finished work in approved location(s) as follows, and obtain approval of appearance from the CA before proceeding.

565 MOCK-UP: At an agreed stage in detailed design work construct a mock-up for Architect's Approval.

Arrange for inspection to be carried out jointly with the CA. Obtain approval of appearance before proceeding. Retain mock-up in undisturbed condition until completion of aluminium installation.

570 EXISTING METAL TO BE RETAINED: Thoroughly clean off deposited dirt by washing with a nonacidic detergent solution and brush. Ensure that run off does not have an adverse effect on other materials.

580 EXISTING METAL TO BE REMOVED will become the property of the Contractor. The scrap value of such metal must be estimated by the Contractor, itemised separately in the tender, and set against the tender sum.

590 REPLACEMENT OF EXISTING METAL must be carried out in small sections at a time to reduce risk of weather damage to a minimum. Provide and maintain temporary waterproof coverings to ensure that there is no damage to the existing base and building.

610 SUITABILITY OF BASES
- Bases must be dry and free of dust, debris, grease and other deleterious matter.
- Laying of aluminium will be taken as acceptance by the aluminium contractor of the suitability of bases.

620 PREPARATION OF EXISTING TIMBER BASES:
- Inform the CA of any defective boards and comply with instructions for replacement. Ensure that all boards are securely fixed. Punch in any protruding fasteners and plane or sand as necessary to achieve an even surface.
- Moisture content: Not more than 22% at time of covering.

630 PLYWOOD UNDERLAYMENT:
- Manufactured to an approved national standard and to BS EN 636. Sheet size 2400 or 1200 x 1200 mm and 6 mm thick.
- Ensure that existing boards are acceptably level. Remove or fill any gross irregularities.
- Lay sheets parallel to perimeter edges with cross joints staggered and a 0.5 to 1 mm gap between sheets.
- Fix with 25 mm annular ringed shank aluminium or galvanized steel nails, at 300 mm grid centres over the area of each sheet and at 150 mm centres along edges, set in 10 mm from perimeter edges and in pairs across joints.
- Ensure that fastenings are driven well in, with heads set flush with surface.

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

650 UNDERLAY:
- Handle carefully to prevent tears and punctures.
- Lay butt jointed onto a dry base and fix edges with aluminium or galvanized steel staples or clout nails.
- Do not lay over eaves and drip/step aluminium underlaps.
- Keep underlay dry and cover with aluminium at the earliest opportunity.

FIXING ALUMINIUM

710 FIXINGS FOR CLIPS:
- Where not specified otherwise, fix to timber bases with: Aluminium nails to BS 1202:Part 3 for aluminium clips, or
  Stainless steel (austenitic) nails for stainless steel clips.
  All nails must be annular ringed or helical threaded shank, flat headed, length not less than 25 mm or equal to base thickness, and shank diameter not less than 2.65 mm.
- Where not specified otherwise, fix to concrete/masonry bases with:
  Sherardized or zinc plated steel screws to BS 1210, table 2, or aluminium screws to BS 1210, table 5 for aluminium clips, or
  Stainless steel (austenitic) screws to BS 1210, table 4 for stainless steel clips.
  All screws must be of length not less than 25 mm and diameter not less than 3.35 mm, with compatible washers and plastics plugs of length and diameter to suit screws.
- Fix to composite metal decks with self tapping screws recommended by the deck and aluminium manufacturer/ supplier for aluminium or stainless steel clips.

720 STANDING SEAM FIXED CLIPS:
- Aluminium clips cut from same alloy and thickness of metal as that being secured.
- Stainless steel (austenitic) clips cut from same thickness of metal as the aluminium being secured.
- Dimensions:
  Width: Not less than 50 mm.
  Base length: Not less than 20 mm.
  Upstand: To suit standing seam profile.
- Unless specified otherwise, secure each clip to base with two fixings.

725 STANDING SEAM SLIDING CLIPS:
- Aluminium clips cut from 0.9 mm thickness of metal of same alloy as that being secured.
- Stainless steel (austenitic) clips cut from same thickness of metal as the aluminium being secured.
- Dimensions:
  Fixed component:
  Width: Not less than 90 mm.
  Base length: Not less than 20 mm.
  Upstand: 20 mm, with slot for locating sliding component.
  Sliding component:
  Width: Not less than 35 mm.
  Upstand: To suit standing seam profile.
- Unless specified otherwise, secure each clip to base with three fixings.

730 BATTEN ROLL CLIPS:
- Aluminium clips cut from same alloy and thickness of metal as that being secured.
- Dimensions:
  Width: Not less than 50 mm.
  Length: Sufficient to pass under batten and turn up each side, with not less than 20 mm projection for folding into welt.
- Unless specified otherwise, secure each clip to base with one fixing.

750 CLIPS FOR FLASHINGS/CROSS JOINTS:
- Cut from aluminium of same alloy and thickness as that being secured.
- Dimensions:

Width: Not less than 50 mm.
Length: Sufficient to suit detail.
- Unless specified otherwise, secure each clip to base with two fixings not more than 50 mm from edge of strip/sheet being fixed.

760 CONTINUOUS CLIPS:
- Cut from aluminium of same alloy and thickness as that being secured, in lengths not exceeding 1.8 m.
- Width: Sufficient to suit detail.
- Unless specified otherwise, fix to base at 150 mm centres. Welt edge of strip/sheet being fixed to continuous clip and dress down.

770 WEDGE FIXING INTO JOINTS/CHASES:
- Carefully rake out joint/chase to a depth of not less than 25 mm.
- Fold aluminium 25 mm into joint/chase with a waterstop welted end. Fix with aluminium wedges at not more than 450 mm centres, at every change of direction, and with at least two for each piece of aluminium.
- Prepare joint/chase and apply sealant as section Z22.
  Sealant: _____

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

790 SCREW FIXING INTO JOINTS/CHASES:
- Carefully rake out joint/chase to a depth of not less than 25 mm.
- Fold aluminium into joint/chase and up back face. Fix into back face with sherardized or zinc plated steel or aluminium 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 aluminium.
- Prepare joint and apply sealant as section Z22.

JOINTING ALUMINIUM

810 FORMING DETAILS:
- Fold and welt aluminium without thinning or splitting the strip/sheet.
- Form all aluminium details with appropriate allowance for thermal movement, without impairment of security at full expansion or contraction.

840 BATTEN ROLL JOINTS:
- Core: Timber as clause 640.
  Size: Not less than 40 mm high x 40 mm wide tapering to 36 mm at apex. Fix to base with sherardized or zinc plated steel, or aluminium countersunk screws at not more than 600 mm centres.
- Fixing of aluminium: In accordance with manufacturer's recommendations.
  Form strips/sheets each side with 5 mm gap for thermal movement, and upstands to 10 mm above the height of the core. Welt clips over upstands. Single lock welt upstands to cappings.

- Cappings: Aluminium of the same alloy, finish and thickness of metal as the strip/sheet being jointed, in lengths not exceeding 1.25 m, with single lock welt end to end joints.

860 DRIP/STEP JOINTS:
- Fold strip/sheet from below step up full height of upstand and fix to top edge.
- Form aluminium underlap/continuous clip:
  Cover to roof slope: Not less than 100 mm with anticapillary welt at top edge.
  Projection: 25 mm for forming into drip welt.
  Downstand: Not less than 40 mm with welt at bottom edge.
- Fix underlap to roof slope at 100 mm centres, avoiding through fixings at longitudinal joint positions.
- Fold strip/sheet from above step around underlap projection and single welt to form a drip.

880 SINGLE LOCK WELT JOINTS:
- Form with 45 mm overlap and 50 mm underlap.
- Welt underlap and secure with clips (clause 750) two per bay.
- Welt overlap around underlap and clips and dress down.

890 DOUBLE LOCK WELT JOINTS:
- Form with 65 mm overlap, 40 mm underlap and clips (clause 750), one per bay.
- Double welt overlap around underlap and clips and dress down.

K10 PLASTERBOARD DRY LININGS/PARTITIONS/CEILINGS

To be read with Preliminaries/General conditions.

TYPE(S) OF DRY LINING

125 METAL STUD PARTITION(S) To Architects Approval.
- Drawing reference(s): **TL100 -101 & 601 -603**
- Manufacturer and reference: British Gypsum Ltd, As indicated
  Studs: __48mm_ at __600_ mm centres.
- Head condition: As indicated
  Deflection allowance: As indicated
- Lining(s): As indicated
  Fixing: As clause 590.
- Cavity insulation:
  Type: As indicated
  Thickness: As indicated

- Acoustic Sealant: As clause 515
- Finishing: As indicated
  Primer/sealer: As manufacturers current written instruction

- Other requirements: Fire stop & Acoustic Sealant at Base and joint locations.

165 WALL LINING ON METAL FRAMING To Architects Approval.
- Drawing reference(s): **TL100 -101 & 601 -603**
- Manufacturer and reference: British Gypsum Ltd, As indicated
- Background: As indicated
- Cavity width (Background to frame): 50mm & As indicated.

- Framing: As recommended for the purpose by the board manufacturer, fabricated from galvanized mild steel sheet to BS EN 10142 designation Fe PO2 G Z 275 NA - C.
  Framing centres: 600 mm.
  Bracket centres: Not more than 800 mm.
- Cavity insulation:
  Type: As indicated
  Thickness: As indicated

- Lining: As indicated
  Fixings: As clause 590.
- Acoustic sealant: As clause 515.
- Finishing: As indicated
  Primer/sealer: As manufacturers current written instruction

- Other requirements: Fire stop & Acoustic Sealant at Base and joint locations.

185 WALL LINING ON ADHESIVE To Architects Approval.
Drawing reference(s): **TL100 -101 & 601 -603**
- Manufacturer and reference: British Gypsum Ltd, As indicated
- Background: As indicated
- Installation: As clause(s) 325, 620
- Lining: As indicated
- Acoustic sealant: As clause 515.
- Finishing: As indicated
  Primer/sealer: As manufacturers current written instruction

- Other requirements: Fire stop & Acoustic Sealant at Base and joint locations.

235 SUSPENDED CEILING ON METAL FRAMING To Architects Approval.
- Drawing reference(s): **TL100 -101 & 601 -603**
- Manufacturer and reference: British Gypsum Ltd. As indicated
- Structural soffit: As indicated
- Suspension system:
  Hangers: As indicated
  Frame: Locate at 600 mm centres suspended from hangers at 600 mm centres.
- Lining: As indicated
  Fixing: As clause 590.
- Insulation: As indicated
- Acoustic sealant: As clause 515.
- Finishing: As indicated
  Primer/sealer: As manufacturers current written instruction
- Other requirements: Fire stop & Acoustic Sealant at joint locations.

245 CEILING LINING ON TIMBER
- Drawing reference(s): **TL100 -101 & 601 -603**
- Background: As indicated
- Lining: As indicated
  Fixing: As clause 610,
- Acoustic sealant: As clause 515.
- Finishing: As indicated
  Primer/sealer: As manufacturers current written instruction
- Other requirements: As indicated

255 CASING ON METAL FRAMING to Structural Steel columns & Beams.
- Drawing reference(s): **TL100 -101 & 601 -603**
- Structural member(s): As Indicated
- Manufacturer and reference: British Gypsum Ltd.
- Fire resistance of complete encasement assembly to BS 476:Part 21: 60 minutes.
- Framing system, including clips and connectors: As recommended for the purpose by the board manufacturer, fabricated from galvanized mild steel sheet to BS EN 10142 designation Fe PO2 G Z 275 NA - C.
- Lining(s): 2 no. 12.5mm Layers Fireline Board.
  Fixing: As clause 590.

- Finishing: 2mm Thin Coat Durafinish Skimcoat.
  Primer/sealer: In Accordance with manufacturers current written instructions.

GENERALLY/PREPARATION

305 COMPLIANCE WITH PERFORMANCE REQUIREMENTS:
- Provide UKAS/NAMAS accredited laboratory test/assessment report(s) for the following:
  ALL FIRE RATED WALLS & CEILING SYSTEMS FOR THE APPROVAL OF THE CA.

All materials, components and details used must be in accordance with the test/assessment report(s). If discrepancies arise, obtain instructions.

Certification of Firestopping / Fire sealing / Cavity barriers;
The Contractor shall provide Certification from a third-party certification body (CERTIFIRE, FIRAS,or similar approved) accredited by the United Kingdom Accreditation Service (UKAS) for all firestopping / fire sealing / cavity barriers etc. The Certificates to be provided for each area of installation shall be signed and dated by a suitably qualified Registered Installer and co-signed by the Main Contractor confirming all installations are compliant with Irish Building Regulations, the requirements of the approved third party certification body and the material manufacturer's written instructions current at the time of installation. The Certificates shall include the following information;

- Certification of products and systems
- Certification of installation contractors
- European Technical Approvals
- Attestation of conformity for the Construction Products Directive (CPD) and
- Quality management system certification to ISO 9001: 2000;

315 EXISTING FIXTURES, SERVICES, ETC: Ensure that surface mounted pipework, conduit, cables, electrical outlets, fixtures, appliances, fixing brackets, clips, skirtings, architraves, etc., are removed from existing backgrounds which are to be lined.

325 PREPARATION OF SOLID BACKGROUNDS:
- Complete all cutting, chasing, plugging and making good.
- Remove all loose material by brushing thoroughly.
- Remove all oil, grease, wallpaper, etc. by scrubbing with water and detergent. Rinse with clean water and allow to dry.
- For adhesive fixed wall linings, adjust suction of background as necessary using primers or bonding agents recommended for the purpose.

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/freestanding wall linings, cut to the full width of the partition/lining.

385 SERVICE PENETRATIONS: The dry lining contractor must liase with the Main Contractor and other contractors to ensure that fire resistance and other specified performance requirements are not impaired by service penetrations.
In particular:
- Form framed openings accurately for grouped services, ducts, etc. allowing for associated fire barriers.

- Provide insulation backings to recessed electrical outlets and switches as recommended by the plasterboard manufacturer.

395 CONTROL SAMPLE(S): Complete area(s) of finished work in approved locations and obtain approval of appearance before proceeding:

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

408 IMPACT RESISTANT PLASTERBOARD: To BS 1230: Part 1, type 1/5 with high density core not less than 925 kg/cu m and heavy duty paper facings.

411 MOISTURE RESISTANT PLASTERBOARD:
To BS 1230:Part 1, type 3 and 4 with moisture resistant core and moisture repellant paper facings.

414 VAPOUR CONTROL PLASTERBOARD:
To BS 1230:Part 1, type 1 with moisture vapour resistance of backing layer not less than 60 MNs/g.

FIXING/FINISHING

435 DRY LINING GENERALLY:
- Fixing, jointing and finishing materials and accessories, where not specified otherwise, to be as recommended by the board manufacturer.
- Handle and store materials in accordance with BS 8212, section 5. Do not use damaged boards.
- Use operatives properly trained for dry lining work and who have attended a recognised training scheme.
- Fix boards only in areas which have been made weathertight. Prevent frost damage.
- Cut boards neatly and accurately without damage to core or tearing of paper facing. Keep cut edges to a minimum and position at internal angles wherever possible. Mask with bound edges of adjacent boards at external corners.
- Fix boards securely and firmly to suitably prepared and accurately levelled backgrounds. Set heads of fastenings in a depression; do not break paper or gypsum core. Finish neatly to give flush, smooth, flat surfaces free from bowing and abrupt changes of level.

445 CEILINGS: Fix boards to ceilings before walls and partitions. Fix boards with bound edges at right angles to supports and with ends staggered in adjacent rows.

455 METAL STUD FRAMING:
- Install using components, accessories and methods recommended by the board manufacturer.
- Set out floor/head channels and perimeter studs to give a framework which is accurately aligned with a true vertical plane. Fix securely at all perimeters at not more than 600 mm centres.
- Position studs at equal centres to suit specified linings, maintaining sequence across openings. Provide additional studs as necessary to ensure support to all vertical edges of boards.
- Accurately form openings to receive doorsets using sleeved/ boxed metal studs and/or suitable timber framing as necessary to achieve the strength grade requirements of the framing assembly and adequately support the weight of the door.

465 STAGGERED STUD PARTITIONS: Ensure that additional noggings, bearers, etc. are fixed between alternate studs and do not touch adjacent offset studs. Do not fix boards to adjacent offset studs.

475 METAL FURRINGS FOR WALL LININGS:
- Install using components, accessories and methods recommended by the board manufacturer.
- Set out furrings vertically, at specified centres and adjacent to angles, openings, movement joints, etc. Maintain centres of furrings across openings. Bed in 200 mm long dabs of adhesive at each end of furring and thereafter at 450 mm centres. Bed short lengths of furring horizontally to provide continuous support to top and bottom edges of boards.
- Accurately align all furrings to a true, vertical plane.
- Install additional furrings where necessary to accept junctions with partitions. Use a continuous line of adhesive to ensure there are no gaps across the cavity.

485 METAL SUSPENDED CEILING FRAMING:
- Install using components, accessories and methods recommended by the board manufacturer.
- Set out perimeter channels, hangers and sections to give a framework which is accurately aligned and level. Fix securely with additional framing and stiffening at upstands, partition heads, access hatches, etc. to give a stable ceiling.

495 MINERAL WOOL INSULATION TO METAL STUD PARTITIONS/LININGS:
- Fit securely with closely butted joints, leaving no gaps. Unless the insulation is of a self supporting slab type fitted between studs, fix at head of frame using timber battens or proprietary clips.

500 MINERAL WOOL INSULATION ACROSS METAL SUSPENDED CEILING FRAMING:
- Use widest practical widths of insulation. Fit securely with closely butted joints, leaving no gaps.
- Cut and fit neatly around any electrical fittings, etc. Do not cover electrical cables (unless they have been sized accordingly).

515 ACOUSTIC SEALANT:
- Sealant: A type recommended by the board manufacturer.
- Location: To perimeter junctions with walls, floors, ceilings and around openings.
- Before fixing boarding, apply as a continuous bead to clean, dry, dust-free surfaces, leaving no gaps.
- After application of sealant, fill gaps greater than about 6 mm with jointing compound recommended by plasterboard manufacturer.

520 AIR PRESSURE SEALANT To perimeter abutments and around openings.
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.
- Sealant: A type recommended by the board manufacturer.
- Location: To perimeter junctions with walls, floors and ceilings, air gaps around openings, and other potential air leakage points including frame members prior to fitting core boards and around fire stops to horizontal joints.
- Apply as a continuous bead leaving no gaps.

525 CAVITY BARRIERS
Installation: Form accurately and fix securely with no gaps to provide a complete barrier to smoke and flame.
Within suspended ceilings: Fixing at perimeters and joints: Secure, stable and continuous with no gaps, to provide a complete barrier to smoke and flame.
Service penetrations: Cut and pack to maintain barrier integrity. Sleeve flexible materials. Adequately support services passing through barriers.
Ceiling systems for fire protection: Do not impair fire resisting performance of ceiling system.

- Material: As indicated on drawings - Material: Intumescent mastic/ sealant. Application: Provide a complete barrier to smoke and flame.
- Form accurately and fix securely across full width of the cavity with no gaps at joints and perimeters, to provide a complete barrier to smoke and flame.

555 FIRE STOPPING: Seal any gaps at junctions of linings and cavity barriers with perimeter abutments, service penetrations, etc. using tightly packed mineral wool or approved intumescent sealant, to prevent penetration of smoke and flame.

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

570 HORIZONTAL JOINTS:
- Horizontal joints will not be permitted in surfaces exposed to view except where the height of partition/lining exceeds the maximum available length of board. Agree positions of joints where not specified.
- For two layer boarding, stagger joints between layers by at least 600 mm.
- Ensure that edges of boards are supported by additional framing. For two layer boarding framing must support the outer layer.

575 PLANK PLASTERBOARD fixed as first layer in two layer boarding to be square edged with long edges at right angles to studs.

580 INSULATION BACKED PLASTERBOARD: Avoid damage to insulation and do not cut away to accommodate services. Carefully cut back insulation or plasterboard as appropriate along edges of boards at angles to give a continuous plasterboard face, with no gaps in the insulation.

590 FIXING PLASTERBOARD TO METAL SUPPORTS:
- Fix securely to all supports, working from the centre of each board using proprietary drywall screws at the following maximum centres:
  - Partition/wall linings: 300 mm centres (reduced to 200 mm at external angles where recommended by the board manufacturer).
  - Ceilings: 230 mm centres (reduced to 150 mm at board ends and at lining perimeters where recommended by the board manufacturer).
- Position screws not less than 10 mm from the edge of the board. Set heads in a depression; do not break paper or gypsum core.
- Type and length of screws as recommended in BS 8212, section 2.2.3, unless specified otherwise.

595 DEFLECTION HEADS: Do not fix boards to head channels when a deflection head is specified.

600 FIXING INSULATION BACKED PLASTERBOARD TO METAL FURRINGS: Apply continuous beads of the plasterboard manufacturer's recommended adhesive sealant to all furrings in addition to screw fixings.

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: 150 mm centres.
  Drywall screws: 300 mm centres for partitions/wall linings (reduced to 200 mm at external angles where recommended by the board manufacturer) and 230 mm centres for ceilings.
- Position fixings not less than 10 mm from bound edges, 13 mm from cut/unbound edges and not less than 6 mm from the edge of the timber support.

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

620 FIXING PLASTERBOARD WITH ADHESIVE DABS:
- Apply grid of adhesive dabs to the background for each board as follows:
  Horizontally: One row of dabs along the top edge and one continuous dab along the bottom edge.
  Vertically: One row of dabs along each edge and thereafter at intermediate spacings to suit size of board:

Thickness (mm)	Width (mm)	Dab centres (mm)
9.5	1200	400
9.5/12.5	900	450
12.5	1200	600

- Dabs: About 50 - 75 mm wide x 250 mm long positioned not less than 25 mm from edges/ends of board. Adjust thickness as necessary to ensure boards are accurately aligned to a true vertical plane.
- Press boards firmly against dabs to give a secure fixing. Provide temporary support under bottom edge of each board until dabs have set.

625 FIXING INSULATION BACKED PLASTERBOARD WITH ADHESIVE DABS:
- In addition to the requirements of clause 620, secure boards with proprietary nailable plugs in locations recommended by the board manufacturer.
- Include proprietary metal clips/plates to edges of each board where recommended by the board manufacturer.

630 FIXING INSULATION BACKED PLASTERBOARD WITH ADHESIVE SPOTS:
- Apply adhesive on a 300 mm grid to background or back of boards. Position perimeter spots about 25 mm from edges of boards. Size of spots to be about 25 mm diameter.
- Press boards firmly into position and secure with proprietary nailable plugs in locations recommended by the board manufacturer and to suit the specified finish.

670 TAPED SEAMLESS FINISH TO PLASTERBOARD:
- Lightly sand cut edges of boards to remove paper burrs. Apply PVAC sealer to exposed cut edges of boards and any other plaster surfaces to which tape is to be applied.
- Fill all joints, gaps and internal angles with joint compound and cover with continuous lengths of paper tape, fully bedded. Reinforce external angles, stop ends, etc. with the specified bead/corner tape.
- When set, cover with joint finish, feathered out to give a flush, smooth, seamless surface.
- Spot nail/screw depressions with joint filler to give a flush surface.
- Fill minor indents. After joint, angle and spotting treatments have dried, lightly sand to remove any minor imperfections.
- Apply specified primer/sealer to give a continuous consistent texture to surface of boards.

680 SKIM COAT PLASTER FINISH:
- Manufacturer and reference: British Gypsum Ltd, Thistle Durafinish
  Thickness: 2 - 3 mm.
- 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.

690 RIGID BEADS/STOPS:
- Manufacturer and reference: British Gypsum Ltd, Thistle Thin Coat.

695 BEADS/STOPS GENERALLY:
- Cut neatly using mitres at return angles. Fix securely using longest possible lengths, plumb, square and true to line and level, ensuring full contact of wings with background.
- After joint compounds/plasters have been applied, remove surplus material while still wet from surfaces of beads which are exposed to view.

720 MINOR DAMAGE IN EXISTING PLASTERBOARD: Where not specified otherwise, repair small areas of broken board by cutting away the paper, removing loose core material and filling with joint filler. Apply PVAC sealer to exposed plaster and cut edge of paper before filling. Finish off to give a flush, smooth surface ready for redecoration.

730 MAJOR DAMAGE IN EXISTING PLASTERBOARD: Where not specified otherwise, repair large damaged areas of board by cutting out and replacing with an identical piece of board. Form a neat hole with sides vertical and horizontal. Fix the patch using the same method as the existing dry lining, ensuring full support to all edges of existing and new board. Fill joints, apply tape and finish off to give a flush, smooth, seamless surface ready for redecoration.

K11 RIGID SHEET FLOORING/SHEATHING/SARKING/LININGS/CASINGS

To be read with Preliminaries/General conditions.

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

150 PLYWOOD ROOF SHEATHING:
- Base: Timber Trusses
  Additional supports as clause 730.
- Plywood: exterior grade plywood to **BS EN 636**
  Service class 3. To BS 6566 or equivalent approved national standard.
  Thickness: As indicated on drawings
  Bond type: As indicated on drawings
  Durability class: As indicated on drawings
  Face grain direction parallel to long edges.
  Edges: Tongued and grooved.
- Long edges running across supports with staggered end joints coinciding with supports.
- Fix at 150 mm maximum centres along edges of boards and 300 mm maximum centres along intermediate supports with 50 mm x 3 mm annular ring shank nails with anti-corrosive finish.
- Perimeter edges: Leave 10 mm clear expansion gap.

160 PLYWOOD FOR BOXINGS TO PIPEWORK (REMOVABLE)
- base: Softwood framing 50 x 50 mm
  Additional supports as clause 730.
- Plywood to B.S. 6566 or equivalent approved national standard.
  Thickness: 9 mm
  Bond type: MR
  Durability class: M
  Face grain direction: Right angles to supports
  Surface grade: Grade II
  Surface finish: Standard
  Edges: Square edge with cover bead
  Treatment: Pre-heated
- Fixing: Fix at 150 mm centres along edges of boards and 300 mm centres along intermediate supports with brass screws and cups.

550 LAMINATED PLASTICS VENEERED BOARD FOR KITCHEN UNITS
- Base: High density chipboard, 650 kg/m^3, waterproofed, 30 mm thick.
  Additional supports as clause 730.
- Laminated plastics veneered board: To B.S. 4965.
  Type: Formica.
  Manufacturer and reference: Duropal or Warerite

Thickness: 1.3 mm
Other requirements: Post forming

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.

720 FLOATING FLOORS: Where to be laid on a new concrete or screed base:
- Ensure that drying aids have been turned off for not less than 4 days, then
- Test for moisture content using an accurately calibrated hygrometer in accordance with BS 8201, Appendix A.
- Take readings in all corners, along edges, and at various points over the area being tested.
- Do not lay flooring until all readings show 75% relative humidity or less.

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.

740 CONDITION sheets by storing on site for at least 48 hours before fixing in conditions similar to those which will prevail after building is occupied. Ensure free circulation of air to all surfaces.

760 FIXING GENERALLY:
- Securely fix sheets to each support without distortion and true to line and level.
- Fastenings to be evenly spaced in straight lines, in pairs across joints and sufficient distance from edge of sheet to prevent damage.
- Remove surplus adhesive as the work proceeds.

765 OPEN JOINTS: Keep perimeter joints, expansion joints and joints between boards free from plaster, mortar droppings and other debris.Remove all temporary wedges and packings on completion of fixing.

770 FIXING HARDBOARD/MEDIUM BOARD/INSULATING BOARD:
- Do not tack corners first.
- Fix one long edge, working outwards from centre.
- Fix to intermediate supports working downward and outward.
- Finally fix remaining three edges.

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

L10 WINDOWS/ROOFLIGHTS/SCREENS/LOUVRES

To be read with Preliminaries/General conditions and Site Specific Window Specification appended to this specification.

PRELIMINARY INFORMATION/REQUIREMENTS

110 EVIDENCE OF PERFORMANCE: Provide independently certified evidence that all specified variants of components comply with specified performance requirements.

115 LOADING
WIND - Minimum of 1.5 kN/m2 or as per the requirements of

I**.S. EN 1991-1-4 Wind actions**
I.S. EN 1991-1-6 Actions during execution

DEAD – This load must be submitted to the Engineer by the Contractor but shall not exceed 0.7 kN/m^2

120 SITE DIMENSIONS must be taken and recorded on shop drawings before starting to make Windows, Doors, Rooflights and Louvres.

125 STRUCTURAL MOVEMENT TO BE ALLOWED IN DESIGN & INSTALLATION
Allowance shall be made in the design, fabrication and installation of all units for movement (deflection) of the Primary Structure as follows;
10mm downward and 5mm upward. The structural design of all glazing shall be carried out in accordance with **BS 6262** or other relevant Irish standard. Submit calculations and details to CA for information before works commence.

130 PROTOTYPES: Prepare one of each of the following and arrange for inspection by the CA before starting repetitive fabrication:
Window, Door & Louvre.

140 CONTROL SAMPLES: After finalisation of all details, prepare one of each of the following, as part of the quantity required for the project, and obtain approval of appearance before proceeding with manufacture of the remaining quantity:
Window, Door & Louvre.

COMPONENTS

400 COMPOSITE WINDOWS:
- Drawing reference(s): **CT105, CT125, CT126, CT155 & CT 165.**
- Manufacturer and reference: Velfac Ltd. – Velfac 200i Window System.

- Exterior frame/sash/cladding material: 54mm wide T-shaped aluminium extrusion alloy EN AW-6060 or EN AW-6063.
- Finish: polyester powder-coated in compliance with BS 6496, BS 6497, GSB and DIN 50939, in RAL colour [As Indicated] to gloss level 77% and a primary coating thickness of between 60-120 µm.

- Interior frame/sash section material: laminated Scandinavian Pinewood (Pinus Sylvestris
- Finish: VACUMAT preservative treated with fungicides and have a further two coat factory pre-finish with an (solvent free) 100% Acryl emulsion/water-based surface treatment. The coating is to have a dry paint thickness of between 60-100 µm and a colourless finish to gloss level 25 (silk matt).

- Weathertightness: To **BS 6375:Part 1.**
  Exposure category (Design wind pressure): **Minimum of 1.5 kN/m2** or as per the requirements of

  I**.S. EN 1991-1-4 Wind actions**
  I.S. EN 1991-1-6 Actions during execution

- Glazing: Structural design in accordance with **BS 6262** and the above referenced codes.
- Ironmongery/accessories: Friction stays, sliding tracks, hinges and handles must be sourced from one single manufacturer and/or must have been developed and engineered specifically with the proposed window system in mind.

  Opening handles are to be single handles incorporating a multipoint locking mechanism fully concealed within the sash with only one handle permitted per window.

- Fixing: In Accordance with the manufacturers current written instructions.
  The use of site-applied wet or dry sealant placed in the outermost plane of the windows/screens in order to seal between units and/or other adjacent materials will be unacceptable.

460 ROOFLIGHTS:
- Drawing reference(s): **CT 106, CT 128 & CT 320**
- Manufacturer and reference: Laantherna by Coxdome Ltd., or similar approved.
  Type: Laantherna or similar approved.
- Glazing details: As indicated
- Frame: Polyester powder coated Aluminium
  Finish: Polyester powder coated colour.
  Colour: As indicated.
- Kerb: As indicated.
- Other requirements: Incorporation of Ventilation system as indicated.
  MINIMUM UPSTAND HEIGHTS AS PER ROOF MANUFACTURER'S REQUIREMENTS.
  ALL UPSTANDS TO BE INSULATED TO MEET **U-VALUE** REQUIREMENTS SPECIFIED FOR THE OVERALL ROOF.

650 METAL LOUVRES:
- Drawing reference(s): **CT 105, CT 128, CT 167, CT 168 & CT 320**
- Manufacturer and reference: Gilberts Ltd.
  Material: As Indicated.
  Blade pitch and angle: As Indicated.

Number of banks: As Indicated.
Special features: As Indicated.
Finish as delivered: As Indicated.
- Fixing: As Indicated.

INSTALLATION

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

720 MOISTURE CONTENT OF TIMBER COMPONENTS: During delivery, storage, fixing and thereafter to Practical Completion maintain conditions of temperature and humidity to suit specified moisture content(s) of 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 (where required)
Protective coating: Two coats of bitumen solution to BS 6949 or an approved mastic impregnated tape.
Timing of application: Before fixing components.

750 BUILDING IN will not be permitted except where specifically stated on the drawings.

751 BUILDING IN: Components which are being built in must be braced and protected as necessary to prevent distortion and damage during erection of adjacent structure.

765 WINDOW INSTALLATION:
- Install windows into prepared openings, maintaining a maximum gap as recommended by manufacturer between the frame edge and the surrounding construction.
- Install windows without twist or diagonal racking.

770 PREPARED OPENINGS: Ensure that dpcs are positioned correctly in relation to frames and are not displaced during fixing operations.

784 FIXING OF COMPOSITE FRAMES:
- Fix vertical jambs of frames using VELFAC Installation lugs (or be galvanised mild steel to a minimum thickness of 3mm or 10gauge, and a minimum width of 50mm)
- When not predrilled or specified otherwise, position fixings not more than 150 mm from each end of jamb, adjacent to each hanging point of opening lights, and at maximum 600 mm centres.

790 FIRE RESISTING FRAMES: Completely fill gap between window and reveal with approved intumescent sealant.

810 SEALANT JOINTS:
- Sealant manufacturer and reference:As Indicated.
Colour: Grey

- Prepare joints and apply sealant as section Z22. Finish triangular fillets with a flat or slightly convex profile.

820 IRONMONGERY: Assemble and fix carefully and accurately using fasteners 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.

L20 DOORS/SHUTTERS/HATCHES

To be read with Preliminaries/General conditions.

PRELIMINARY INFORMATION/REQUIREMENTS

110 EVIDENCE OF PERFORMANCE: Provide independently certified evidence that all specified variants of components comply with specified performance requirements.

115 FIRE RESISTING TIMBER DOOR/DOORSETS: Provide evidence, in the form of a product conformity certificate, test report or engineering assessment, that each fire door/doorset supplied will comply with the specified requirements for fire resistance if tested in accordance with **BS 476:Part 8 and 22**. Such certification must cover door and frame materials, glass and glazing materials and installation, essential and ancillary ironmongery, hinges and seals.
Fire performance as follows;

Fire resistant doorsets and shutter assemblies:
Type testing: To BS 476-22 or BS EN 1634-1.

Smoke control doorsets and shutter assemblies:
• Type testing: To BS 476-31.1 or BS EN 1634-3.

Intumescent seals:
• Type testing: To BS 476-23.
Testing authority: UKAS accredited.

150 SITE DIMENSIONS must be taken and recorded on shop drawings before starting to make Doorsets

170 CONTROL SAMPLES: After finalisation of all details, prepare one of each of the following, as part of the quantity required for the project and obtain approval of appearance before proceeding with manufacture of the remaining quantity:
Complete doorset.

COMPONENTS

230 **INTERIOR TIMBER FLUSH DOORS:** Timber quality: To BS EN 942
- Drawing reference(s): **CT 105, CT129 & CT 130.**
- Manufacturer and reference: Laminated / Veneered Solid Core Doorsets.
- Core: Solid core
- Facings: As Indicated.
- Lippings: As Indicated.

Service life: **Not less than 30 years.**

- Moisture content on delivery: **16% +/- 2**
- Glazing details: As Indicated.
- Finish as delivered: As Indicated.
- Other requirements: As Indicated.

330 DOOR FRAMES:

- Drawing reference(s): **CT129 & CT 130.**
- Timber to BS EN 942.
  Wood species: As Indicated.
  Class: J2
- Preservative treatment: Organic solvent as section Z12 and British Wood Preserving and Damp-proofing Association Commodity Specification C5.
  Desired service life: 50 years.
- Joinery workmanship: As section Z10.
- Adhesive: As Indicated.
- Moisture content on delivery: **16% +/- 2**
- Perimeter seals: As Indicated.
- Finish as delivered: As Indicated.
- Fixing: As Indicated.

480 **EXTERNAL COMPOSITE DOORSETS:**

- Drawing reference(s): **CT105, CT125, CT126, CT155 & CT 165.**
- Manufacturer and reference: Velfac Ltd. – Velfac 600 Glazed Door System.

- Exterior frame/sash/cladding material: 54mm wide T-shaped aluminium extrusion alloy EN AW-6060 or EN AW-6063.
- Finish: polyester powder-coated in compliance with **BS 6496, BS 6497, GSB and DIN 50939,** in RAL colour [As Indicated] to gloss level 77% and a primary coating thickness of between 60-120 µm.

- Interior frame/sash section material: laminated Scandinavian Pinewood (Pinus Sylvestris
- Finish: VACUMAT preservative treated with fungicides and have a further two coat factory pre-finish with an (solvent free) 100% Acryl emulsion/water-based surface treatment. The coating is to have a dry paint thickness of between 60-100 µm and a colourless finish to gloss level 25 (silk matt).

- Weathertightness: To BS 6375:Part 1.
  Exposure category (Design wind pressure): **WIND - Minimum of 1.5 kN/m2** or as per the requirements of I**.S. EN 1991-1-4 Wind actions** and **I.S. EN 1991-1-6 Actions during execution**

- Glazing: **WIND - Minimum of 1.5 kN/m2** or as per the requirements of I**.S. EN 1991-1-4 Wind actions and I.S. EN 1991-1-6 Actions during execution.** Design in accordance with **BS 6262.**

- Ironmongery/accessories: must be sourced from one single manufacturer and/or must have been developed and engineered specifically with the proposed door system in mind.
- Fixing: In Accordance with the manufacturers current written instructions.
  The use of site-applied wet or dry sealant placed in the outermost plane of the windows/screens in order to seal between units and/or other adjacent materials will be unacceptable.

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: (WHERE REQUIRED) Before fixing, apply two coats of bitumen solution to BS 6949 or an approved mastic impregnated tape, to surfaces of all components.

750 DOORSETS: Do not fix until rooms are weathertight and the work of wet trades is finished and dried out.

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

761 BUILDING IN: Components which are being built in must be braced and protected as necessary to prevent distortion and damage during erection of adjacent structure.

770 BUILDING IN TIMBER FRAMES: Fix dpcs with galvanized clout nails to backs of frames which are to be built into external openings.

780 PREPARED OPENINGS: Ensure that dpcs are positioned correctly in relation to frames and prevent displacement during fixing operations.

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

800 LOOSE THRESHOLDS: Fix 150 mm from each end and at 600 mm maximum centres.

809 FIRE RESISTING DOORS/DOORSETS must be installed by a firm currently listed in the FIRAS Register of Accredited Installers, in accordance with instructions supplied with the product conformity certificate, test report or engineering assessment.

810 FIRE RESISTING DOORS/DOORSETS: Completely fill gap between frame and reveal with intumescent sealant.

820 SEALANT JOINTS:
- Sealant manufacturer and reference: Sealmaster or similar approved
  Colour: Neutral
- Prepare joints and apply sealant as section Z22.
  Finish triangular fillets with a flat or slightly convex profile.

830 FIXING IRONMONGERY GENERALLY:

- Assemble and fix carefully and accurately using fasteners supplied by the ironmongery manufacturer, with matching finish and equivalent corrosion resistance.
- Holes for components to be no larger than the minimum required for satisfactory fit/operation.
- Protect ironmongery and adjacent surfaces as necessary to prevent damage.
- At completion, check, adjust and lubricate as necessary to ensure correct functioning of all moving parts.

840 FIXING IRONMONGERY TO FIRE RESISTING DOOR ASSEMBLIES:
- Fix all items in accordance with door leaf manufacturer's recommendations.
- Ensure that, when fixed, ironmongery does not compromise the integrity of the assembly as established by testing/ assessment.
- Cut holes for through fixings and components accurately. Clearances must not be greater than 8 mm unless protected by intumescent paste or similar.
- Coat lock/latch cases for FD60 doors with intumescent paint or paste before fitting.

850 LOCATION OF HINGES:
- Where not specified otherwise, position hinges with centre lines 250 mm from top and bottom of door leaf.
- Position third hinge (where specified) As Indicated.
- Position hinges for fire resisting doors in accordance with door leaf manufacturer's recommendations.

860 EMERGENCY EXIT DEVICES: Unless specified otherwise, install panic bolts/latches in accordance with IS EN 1125.

L40 GENERAL GLAZING

To be read with Preliminaries/General conditions.

Comply with the requirements of;
IS EN 1279
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.

Heat soaking of thermally toughened glass
Heat soaking regime: Glass specified as 'heat soaked' to BS EN 14179-1 must be subjected to a heat soaking regime designed to
reduce the incidence of failure due to nickel sulfide inclusions.
• Heat soaking period (minimum): Submit proposals.
• Mean glass temperature: 290 ±10°C.
Certified evidence of treatment: Submit.
Impact resistance
Plastics: To BS 6206.

Glass: To BS 6206 or BS EN 12600.
Fire resistance
Test standards: To BS 476-22 or BS EN 1364-1.
Mirrors
General: Silvered to give maximum reflection, free from distortion, tarnishing, discoloration, scratches and other defects visible in the designed viewing conditions.

111 PREGLAZING of components will be permitted, but:
- Precautions to be taken to prevent displacement of glazing or compound. Submit details and obtain approval.
- Panes with any displaced glazing or compound or with defective seals to be reglazed in situ.

130 REMOVAL OF GLAZING FOR REUSE:
- Carefully remove existing glazing and glazing compound, beads, etc., avoiding damage to the frame, to leave clean smooth rebates free from obstructions and debris.
- Report to CA any signs of deterioration of the surround revealed by removal of glazing, compounds, etc. Do not reglaze affected surrounds until instructed.
- Clean glazing, beads and other components that are to be reused.

140 SAMPLES of the following, not less than 150 mm square, to be submitted and approved before cutting panes:
External Window Glazing & internal Standard and Fire rated Vision panels.

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.

151 PREPARATION: Ensure that preparation by others of surrounds, rebates, grooves and beads is complete. Clean surfaces before installing glazing.

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 **IS EN 572**, free from scratches, bubbles, cracks, rippling, dimples and other defects.

160 DIRECTIONALLY PATTERNED/WIRED GLASS:
- Fix with pattern/wires parallel to surround.
- Align in adjacent panes where seen together at close quarters.

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

170 PLASTICS GLAZING SHEET: Free from scratches, edge splits and other defects. Carefully peel back protective coverings from edges and trim off to facilitate glazing. Retain remainder in place until Practical Completion unless instructed otherwise.

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 150 mm centres, and within 50 mm of each corner. Punch pins just below the timber surface.

181 BEAD FIXING WITH SCREWS: Space screws evenly at not more that 225 mm centres, and within 75 mm of each corner.

190 GLASS TO GLASS JOINTING:
- Sealant: Clear silicone to BS 5889, Type A or B as recommended for the purpose by the manufacturer.
- Joints to be of consistent width suitable to receive sealant.
- Completely fill joints with sealant, leaving no gaps or bubbles. Remove surplus sealant to leave a clean, neatly finished weathertight joint.

500 FIRE RESISTANT GLAZING to Fire Doors
- Drawing reference(s): **TL100 -101 & 601 -603**
- Fire rating: FR 30 mins
- Pane material: Pyrobel -12 or similar approved.
- Surround/bead: As Indicated.
  Bead fixing: As Indicated to comply with **BS 476 & BS 6206 & IS EN 12600**
- Glazing system:
  Tape: In accordance with manufacturers current written instructions.
  Pointing sealant: In accordance with manufacturers current written instructions.
- Apply glazing tape/strip to beads and fix as specified. Leave no gaps at corners.
- Locate glazing centrally in surround using hardwood/ noncombustible setting and location blocks as required.
- Apply pointing sealant immediately after glazing and finish to a smooth chamfer.

505 FIRE RESISTANT GLAZING
- Drawing reference(s):
- Fire rating: FR 60 mins
- Pane material: Pilkington Secur - vu glazed vision panel incorporating Pyroshield 1hr fire rated galzing

- Surround/bead: In accordance with manufacturers current written instructions.
  Bead fixing: In accordance with manufacturers current written instructions.
- Glazing system:
  Tape/strip: In accordance with manufacturers current written instructions.
  Pointing sealant: In accordance with manufacturers current written instructions.
- Installation to be carried out by a FIRAS accredited installer in accordance with glazing manufacturer's recommendations.

520 FIRE RATING:

- Submit proposed construction details of Fire Rated Glazing to a UKAS/NAMAS accredited laboratory or other approved authority for assessment of its capability of achieving the specified fire rating.
- If required, prepare specimen(s) of the construction in accordance with BS 476:Part 20, appendix A3, and submit for testing to BS 476:Part 22.
- Submit all assessment or test results to CA immediately they are available, and before installing glazing.

550 GLASS MIRRORS

- Drawing reference(s): **TL100 -101 & 601 -603**
- Mirror material: Float glass, silvered to give maximum reflection, free from tarnishing, discoloration, scratches and other defects visible in the designed viewing conditions.
  Thickness: 6 mm
  Backing: As Indicated.
  Edge treatment: As Indicated.
- Background: As Indicated.
- Fixing method: Evode Specialist Superfix, 3mm bedding.
- Fix accurately and securely, but without overtightening fastenings, to provide a flat surface giving a distortion free reflection.

  6mm Polished plate toughened safety glass mirror with polished edges, bonded to wall with Evode Specialist Superfix, 3mm bedding.
  Silicone to perimeter: Evode Evostick Antibac Sealant, netural cured, Colour: White.

M10 CEMENT:SAND/CONCRETE SCREEDS/TOPPINGS

To be read with Preliminaries/General conditions.
Refer to Section E of this specification for additional requirements in relation to Non-Structural Concrete Screeds

1. Unless otherwise noted in this Specification, screeds shall comply with **IS EN 13813** Screed materials and floor screeds – Properties and requirements.

2. Concrete screeds shall be laid flat or to the falls indicated on the Drawings.

3. Separate bonded screeds shall be a minimum of 40mm thick laid on a roughened, cleaned, damped and grouted surface. Separate unbonded screeds shall be a minimum of 65mm thick and shall incorporate mesh wire netting of mesh size 31 to 50mm in accordance with BS 1485, zinc coated hexagonal steel wire netting.

4. Screed mixes shall be a **PROPRIETARY SCREED SYSTEM** unless noted otherwise or where approved by the Architect a TRADITIONAL SCREED comprising 1 part cement, 1.50 parts sand to 3 parts coarse aggregate (max. size 10mm). Screeds shall be placed semi-dry with only sufficient water to permit thorough compaction. Where the thickness of screed exceeds 40mm it shall be laid in two courses, each at least 20mm thick but with the first course thicker than the second course. The second course shall be placed immediately after compaction of the first course.
5. Screeds shall be cured using polythene sheeting for at least 1 week and thereafter shall be protected from traffic by covering with planks etc., until ready to lay the floor finish.

TYPE(S) OF SCREED/TOPPING

GENERALLY/PREPARATION

210 SUITABILITY OF BASES: Before starting work ensure that:
- Bases are such as to permit specified levels and flatness/regularity of finished surfaces, bearing in mind the permissable minimum and maximum thicknesses of the screed/topping.
- Bases are sound and free from significant cracks and gaps.
- Bases are clean and free from plaster, dirt, dust and oil.
- Concrete slabs to receive fully or partially bonded construction have been allowed to dry out by exposure to the air for not less than 6 weeks.

220 **PROPRIETARY SCREEDS/ NON-STRUCTURAL TOPPINGS**: Where any screed/topping is described as 'proprietary' or 'non-structural' all materials, mix proportions, mixing methods, minimum/maximum thicknesses and workmanship must be in accordance with the recommendations of the stated manufacturer even though that manufacturer may not supply all of the required materials. Non-structural Screed Specification:
Proprietary Screed to **BS.EN.13813 and BS8204**

Minimum cover to underfloor heating pipes: **30mm to BS8204-7**
Screed to be capable of withstanding temperatures advised by the Underfloor Heating (UFH) System Subcontractor.

The Main Contractor is to co-ordinate the location of Screed joints and all other Screed requirements. Reference Joint Location Plan, UFH System Subcontractor Joint Requirements and Screed Manufacturer (and Subcontractor) Joint Requirements

Moisture content of the Screed is to be checked by the Main Contractor prior to the application of Floor Coverings. Written confirmation of the suitability of the Screed to receive floor finishes shall be provided by the Main Contractor to the Architect in advance.

The Main Contractor is to co-ordinate all other requirements of the Screed manufacturer and Flooring Subcontractor prior to the laying of the Screed

250 CONDUITS UNDER FLOATING SCREEDS: Haunch up in 1:4 cement:sand on both sides of conduits before laying insulation for floating screeds. Concrete sub-floor tracks to be installed to allow pipework to be fully covered with 65 mm screed.

251 CONDUITS which are to be cast into or under screeds:
- Overlay with 500 mm wide strip of steel fabric to BS 4483, reference D49, or Welded mesh manufactured in rolls from mild steel wire not less than 1.5 mm diameter to BS 1052, mesh size 50 x 50 mm.
- Place the reinforcement at mid depth between the top of the conduit and the screed surface.

255 PIPE DUCTS/TRUNKING: Before laying screed, ensure that preformed access ducts are securely fixed to the base and accurately levelled in relation to the finished floor surface.

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.
- As an alternative to wetting and slurrying, prepare, prime as necessary and apply a bonding agent to manufacturer's recommendations.
- Lay screed/topping while slurry or bonding agent is still wet to ensure a good bond.

280 UNBONDED CONSTRUCTION: Unless the screed is laid over a suitable sheet dpm, lay a separating layer on clean base, lapping 100 mm at joints.

290 FLOATING CONSTRUCTION:
- Insulation: XTRATHERM (XT/UF) 90mm PIR INSULATION
- Lay insulation with tight butt joints and continue up at all abutments with walls, columns, etc. for full depth of screed.
- Lay separating layer of polythene sheet (gauge to screed manufacturer's requirement's) over insulation, tape and lap 100 mm at joints.
- Lay wire netting to BS 1485, mesh size 50 mm, wire designation 19, over separating layer with 50 mm laps and tie securely with steel wire.

BATCHING/MIXING/LAYING

310 BATCHING: Proportions of mixes made with dense aggregates are specified by weight and, where practicable, should be batched by weight. Volume batching will be permitted on the basis of the previously established weight:volume relationship(s) of the particular materials and using accurate gauge boxes. Allow for bulking of damp sand.

311 BATCHING: Proportions of mixes made with lightweight aggregates are specified by volume and should be batched using accurate gauge boxes.

330 MIXING:
- Do not use admixtures containing calcium chloride.
- Water content of mixes to be the minimum necessary to achieve full compaction, low enough to prevent excessive water being brought to the surface during compaction.
- Mix materials thoroughly to a uniform consistence. Mixes other than no-fines must be mixed in a suitable forced action mechanical mixer. Do not use a free fall type (drum) mixer.
- Use while sufficiently plastic for full compaction.
- Use ready-mixed retarded screed mortar within the working time and site temperatures recommended by the manufacturer. Do not retemper.

340 ADVERSE WEATHER:
- Do not lay screeds/toppings unless their surface temperature can be maintained above 5 degC for not less than 4 days thereafter.
- In hot weather reduce the time between operations or use other measures to prevent premature setting or drying out.

350 JOINTS IN SCREEDS: Unless otherwise specified:

- Cast screeds continuously, as far as possible without defined joints, using 'wet screeds' between strips or bays. Obtain approval for positions of bay joints.
- Form day joints with a vertical edge.

360 JOINTS IN TOPPINGS:
- Unless otherwise specified, bay sizes to be **not more than 6 sq m, ratio of length to breadth not more than 3:2, a joint occurring over every construction joint in the base slab.**
- Where location of bay joints is not shown on drawings obtain approval before starting work.
- Forms to be square edged with steel top surfaces, securely fixed.
- Compact thoroughly at edges to give level, closely abutted joints with no lipping.

- Alternatively, toppings may be cast continuously, bay joints being formed with approved plastics or metal dividing strips.

370 LEVELS OF FLOOR SCREEDS/TOPPINGS: Permissible deviation in level of surface of screeds (allowing for thickness of coverings) and toppings from datum: +/- 10 mm.

380 FLATNESS/REGULARITY OF FLOOR SCREEDS: Sudden irregularities are not permitted. When measured with a slip gauge to BS 8204:Part 1, 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:
- Screeds to receive toppings or beds 15-30 mm thick: 10 mm under a 3 m straightedge
- Screeds to receive mastic asphalt flooring/underlays:
  5 mm under a 3 m straightedge
- Screeds to receive sheet or tile finishes bedded in adhesive:
  5 mm under a 3 m straightedge
  2 mm under a 1 m straightedge

400 COMPACTION OF SCREEDS: Compact proprietary screeds using methods recommended by the manufacturer. Compact other screeds as follows:
- Compact screed layer(s) thoroughly by mechanical means (e.g. plate vibrator) or, where this is not practicable, by hand using a handrammer or weighted roller.
- Lay screeds over 50 mm thick in two layers of approximately equal thickness. Roughen the surface of the compacted lower layer and immediately lay the upper layer.

410 COMPACTION OF TOPPINGS: Compact proprietary toppings using methods recommended by the manufacturer. Compact other toppings thoroughly with a double beam vibrator or plate vibrator.

420 STAIR SCREEDS/TOPPINGS:
- Construction: Bonded as clause 260 to treads, risers and landings.
- Form risers with fine finish formwork.
- Make good surfaces of toppings with cement:fine aggregate and a wood float, and when hardened rub to remove laitance.

425 CRACK CONTROL REINFORCEMENT:
- Type: A142 to BS 4483.
- Place between the two layers of screed, lap edges not less than 100 mm and tie securely with steel wire. Ensure continuity through daywork joints.
- Where necessary arrange reinforcement to avoid a four layer build up at corners.

428 HEATED SCREEDS:

- Collaborate with the services subcontractor to ensure that screed bays are properly coordinated with the heating circuits and that all technical requirements are satisfied.
- Ensure that the heating elements are properly secured to prevent displacement whilst the screed is laid.
- Lay screed carefully ensuring thorough compaction around the heating elements without damaging them.
- Ensure that recommendations for curing and controlled heating of screed are followed.

455 SEALANT MOVEMENT JOINTS WITH METAL EDGINGS
AS INDICATED ON DRAWINGS – SUBMIT ALL DETAILS TO CA FOR APPROVAL

465 METAL SECTION MOVEMENT JOINTS
AS INDICATED ON DRAWINGS – SUBMIT ALL DETAILS TO CA FOR APPROVAL

475 STRIP MOVEMENT JOINTS
AS INDICATED ON DRAWINGS – SUBMIT ALL DETAILS TO CA FOR APPROVAL

FINISHING/CURING

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

520 WOOD FLOATED FINISH: Use a wood float to give an even slightly coarse texture with no ridges or steps.

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

540 TROWELLED FINISH TO RECEIVE APPLIED FLOOR FINISHES:
- Float to an even surface with no ridges or steps.
- 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.
- If, because of inadequate finishing or protection, the surface of the screed 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.

550 TROWELLED FINISH FOR WEARING SURFACES:
- Float to an even surface with no ridge or steps.
- As soon as the surface is sufficiently hard, steel trowel by hand or machine. Retrowel at least twice at intervals until a hard closed finish is obtained and there is little or no effect from further trowelling.
- Finished surfaces must be uniform, smooth and free from trowel marks and other blemishes.

560 DEWATERED TROWELLED FINISH FOR WEARING SURFACES:
- Immediately after compaction of the concrete, apply the vacuum dewatering process in accordance with the equipment manufacturer's recommendations.
- Without delay float the surface using a power float to give an even surface with no ridges or steps.

- As soon as the surface is sufficiently hard, steel trowel by hand or machine. Retrowel at least twice at intervals until a hard closed finish is obtained and there is little or no effect from further trowelling.
- Finished surfaces must be uniform, smooth and free from trowel marks and other blemishes.

570 NONSLIP TROWELLED FINISH FOR WEARING SURFACES:
- Float to an even surface with no ridges or steps.
- As soon as the surface is sufficiently hard, steel trowel by hand or machine. Retrowel at least twice at intervals until a hard closed finish is obtained and there is little or no effect from further trowelling.
- Finished surfaces must be uniform, smooth and free from trowel marks and other blemishes.
- Apply silicon carbide or aluminium oxide, graded between BS 410 sieves 1.7 mm and 500 micrometres, sprinkling evenly at the rate of 1 kg/sq m. Trowel into the surface while the concrete is still plastic.

600 POWER GROUND FINISH FOR WEARING SURFACES:
- Float to an even surface with no ridges or steps.
- When concrete is sufficiently hard for sand particles not to be torn from the surface, power grind to remove 1-2 mm from surface to give an even glass-paper texture, free from blemishes and trowel marks.
- Remove all dust and wash down. Replace waterproof sheeting without delay to complete the specified curing.

650 CURING: Unless otherwise specified:
- Immediately after laying, protect surface from wind, draughts and strong sunlight.
- As soon as screed/topping has set, closely cover with polyethylene sheeting and keep in position for not less than 7 days.
- Do not heat screeds/toppings or the building artificially during first 4 to 6 weeks after laying, thereafter raise temperature slowly.

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

670 ROOF SCREEDS: Cover screeds during wet weather and arrange building programme to ensure that they are as dry as practicable when weathertight coverings are laid.

M20 PLASTERED/RENDERED/ROUGHCAST COATINGS

To be read with Preliminaries/General conditions and comply with the following standards;

I.S. EN 998-1:2003 Specification for mortar for masonry. Rendering and plastering mortar.
I.S. EN 13914-1:2005 Design, preparation and application of external rendering and internal plastering. External rendering.
I.S. EN 13914-2:2005 Design, preparation and application of external rendering and internal plastering. Design considerations and essential principles for internal plastering.
BS 5262:1991 Code of Practice for external renderings.
BS 5492:1990 Code of Practice for internal renderings.

TYPE(S) OF COATING

240 ONE COAT Monocouche RENDER
- Location: External Walls
- Background: 100mm Blockwork outer leaf &
  ON PAPER BACKED METAL LATH ON DPC on battens
  Preparation: In accordance with manufacturers current written instructions.
- Plaster proprietary reference: Monocouche Self Coloured Render.
  Application: As Indicated.
  Thickness (excluding dubbing out): 18-25mm
  Finish: As Indicated.
- Accessories: In accordance with manufacturers current written instructions.

280 BOARD FINISH PLASTER ON PlasterBoard Linings
- Location: As Indicated.
- Background: As Indicated.
- Plasterboard backing: As clause K10
- Skim coat(s): Board finish plaster to BS 1191:Part 1, Class B.
  Proprietary reference: British Gypsum Thincoat Durafinish Skimcoat
  Thickness: 2 mm applied in 2 coat(s).
  Finish: Smooth as clause 777.
- Accessories: As Indicated.

GENERAL REQUIREMENTS FOR WORKMANSHIP

418 CONTROL SAMPLE(S): Complete sample area, being part of the finished work, in approved location, and obtain approval of appearance before proceeding:

423 UNIFORMITY OF COLOUR AND TEXTURE: Once samples of coatings have been approved do not change type or proportion of constituent materials. Ensure that supplies of materials are sufficient to give consistent and uniform colour and texture. Obtain each material from one source and mix different loads if necessary.

433 PROPORTIONS FOR CEMENT GAUGED MORTARS: Except where specified otherwise, mix proportions for cement gauged plaster/render undercoat mortars are to be in accordance with the following designations:

Mix type	Mix designation				
	1	2	3	4	5
Cement:lime: sand	1:¼:3	1:½:4 to 1:½:4½	1:1:5 to 1:1:6	1:2:8 to 1:2:9	1:3:10 to 1:3:12
Cement: premixed lime & sand (proportion of lime to sand given in brackets)	1:3 (1:12)	1:4 to 1:4½ (1:9)	1:5 to 1:6 (1:6)	1:8 to 1:9 (1:4½)	1:10 to 1:12 (1:4)
Cement:sand	-	1:3	1:5	1:7	-

(using plasticizer)		to 1:4	to 1:6	to 1:8	
Masonry cement:sand	-	1:2½ to 1:3½	1:4 to 1:5	1:5½ to 1:6½	-

438 CEMENT: As specified in the type of coating clause(s).
- Where Portland cement is specified Portland blastfurnace cement or Portland pulverized-fuel ash cement may be used as an alternative.
- Where Portland cement, Portland blastfurnace cement, Portland pulverized-fuel ash cement or Sulfate-resisting Portland cement is specified use Class 42.5 or 52.5 material as defined by the appropriate British Standard.
- All cements must comply with the appropriate British Standard and be licensed under the BSI Kitemark scheme for cement.

441 SITE PREPARED LIME:SAND FOR CEMENT GAUGED MORTARS: When pigment is not required, lime:sand may be prepared on site in lieu of ready-mixed material, using sand as specified in the type of coating clause(s), by:
- Thoroughly mixing lime putty, ready prepared to BS 890, with sand, or
- Thoroughly mixing hydrated lime powder to BS 890 with sand, first in the dry state and then with water. Keep for at least 16 hours before use and prevent from drying out.

444 READY-MIXED CEMENT GAUGED MORTARS may be retarded provided they are to BS 4721, used within the working time and site temperatures recommended by the manufacturer and not remixed on site.
Obtain from an approved supplier as approved by the Architect

449 ADMIXTURES:
- Do not use unless specified or approved.
- Do not use admixtures of any type with proprietary mixes.
- Do not use calcium chloride or any admixtures containing calcium chloride.

453 MIXING:
- Measure materials accurately by volume using clean gauge boxes. Proportions of specified mortar mixes are for damp sand. Adjust proportions if dry sand is used.
- Mix materials thoroughly to a uniform consistency and appearance using suitable mechanical or manual means or, for proprietary mixes, as recommended by the manufacturer.
- Do not overmix gypsum plasters or cement gauged mixes containing air entraining admixtures.

458 CONTAMINATION: Do not allow contamination of one type of material by another, or by any set material.

461 INITIAL SET: Do not use mixes after initial set has taken place. Do not retemper or reconstitute mixes, unless permitted by the manufacturer of proprietary mixes.

466 SCAFFOLDING: Use independent scaffolding to avoid putlog holes and other breaks in coatings.

469 CLEANLINESS: Protect thoroughly all existing work and approaches using suitable boards, sheets, etc. Clean off all droppings on to finished work immediately.

474 COLD WEATHER:
- Do not carry out external work when air temperature is below 3°C and falling or below 1°C and rising.
- Take all necessary precautions to enable internal coating work to proceed without damage when air temperature is below 3°C.
- Do not use frozen materials and do not apply coatings to frozen or frost bound backgrounds.

481 READY PREPARED LIME PUTTY:
- Use lime putty slaked directly from CL 90 (high calcium) quicklime to BS 890, using an excess of water and matured in pits/containers that allow excess water to drain away.
- Density of matured lime putty: 1.3 to 1.4 kg/litre.
- Maturity of lime putty before use: Not less than 90 days after slaking.
- Prevent lime putty from drying out and protect from frost.

485 SITE PREPARED NONHYDRAULIC LIME:SAND MORTAR:
- Lime putty: As clause 481.
- Thoroughly mix lime putty with sand (or knock up previously prepared mortar) either mechanically or manually. Add only sufficient water to produce a workable mix.

488 SITE PREPARED HYDRAULIC LIME:SAND MORTAR:
- Thoroughly mix hydraulic lime powder with sand, first in the dry state and then with water. Add only sufficient water to produce a workable mix.
- Do not retemper or use mortar that has begun to stiffen.

496 WORK TO HISTORIC PLASTER/RENDERS GENERALLY:
- Materials, and methods of working for the repair and replacement of plasterwork (decorative and plain) must match that of the original work as closely as possible, unless specified otherwise.
- Before commencing work, agree mixes, preparation and application methods with the CA.
- Use plasterers who are skilled and experienced in the repair and replacement of historic plasterwork

498 PROTECTION OF HISTORIC PLASTERWORK: Prevent damage and disfigurement to plain and decorative plasterwork during the course of the works:
- Provide or ensure provision of protection and/or temporary support to all vulnerable areas of plasterwork using methods agreed with the CA.
- Adopt careful working methods when working alongside or above plasterwork to prevent disturbance from vibration and impact.
- Do not make temporary fixings into decorative plasterwork or apply adhesive tape to plaster surfaces.
- Do not allow rigid boards, battens, etc. to touch plasterwork directly. Sandwich an isolating layer of mineral wool or other approved soft material between the boards and plaster face. Ensure that the isolating layer is firmly pressed against the plaster face.

PREPARING BACKGROUNDS

507 ACCEPTANCE OF BACKGROUNDS: Before preparation or application of coatings ensure that:
- Backgrounds are secure, adequately true and level to achieve specified tolerances, free from contamination and loose areas, reasonably dry and in a suitable condition to receive specified coatings.

- All cutting, chasing, fixing of concealed conduits, service outlets and the like, and making good of the background, is completed.

511 PREPARATION GENERALLY:
- Remove efflorescence, dust and other loose material by thoroughly dry brushing.
- Remove all traces of paint, grease, dirt and other materials incompatible with coating by scrubbing with water containing detergent and washing off with plenty of clean water. Allow to dry before applying coatings unless specified otherwise.

515 KEYING/BONDING: Prepare backgrounds as specified for the type of coating to be applied. Methods other than those specified may be submitted for approval.

518 IN SITU CONCRETE SURFACES: Scrub with water containing detergent to ensure complete removal of mould oil, surface retarders and other materials incompatible with coating. Rinse with clean water and allow to dry unless specified otherwise.

521 SMOOTH CONCRETE SURFACES: Where no keying mix or bonding agent is specified, wet smooth concrete surfaces immediately before plastering.

524 PREVIOUSLY PAINTED SURFACES: Remove all paint by needle hammering or other suitable method.

527 RAKING OUT FOR KEY: Rake out soft joints in old brickwork to a depth of not less than 10 mm. Brush out joints to remove dust.

531 HACKING FOR KEY: Roughen surfaces thoroughly and evenly by removing the entire surface to a depth of 3 mm by scabbling, bush hammering or abrasive blasting. Clean surfaces by washing and brushing.

536 SPATTERDASH KEYING MIX:
- 1 part Portland cement.
  1½-2 parts clean sharp, coarse sand.
- Mix to a thick slurry and keep well stirred.
- Throw onto previously dampened surface to a thickness of 3-5 mm and leave rough. Keep damp with fine waterspray or by covering with polyethylene until set. Allow to dry out slowly and harden before applying undercoat.

541 BONDING AGENT:
- Type: **SUBMIT FOR ARCHITECT'S APPROVAL**
- Dilute to manufacturer's recommendations.
- Apply subsequent plaster/render coating whilst bonding agent is still tacky to ensure a good bond.

546 POLYVINYL ACETATE (PVAC) SEALER: A type of emulsion recommended by the plaster manufacturer, or approved. Dilute to sealer manufacturer's recommendations.

549 ZINC OXYCHLORIDE PLASTER:
- Manufacturer and reference: **SUBMIT FOR ARCHITECT'S APPROVAL**
- Agree with CA extent of area to be covered. Apply not less than 6 mm thick, extending beyond infected area by not less than 300 mm. Do not penetrate coating when cross scratching for key.

551 EXISTING PLASTER/RENDER: The extent and location of renewal of existing coatings (plain and decorative work) must be agreed, at least on a provisional basis, with the CA

before the work is started. Remove existing coatings in ways that will reasonably minimise the amount of removal and renewal.

556 REPAIRING EXISTING RENDER:
- Cut out all loose, hollow, soft, friable, badly cracked or otherwise damaged areas to form rectangular patches with straight horizontal and vertical edges, square cut or slightly undercut.
- Cut back to imitation joint lines where they occur.
- Cut out cracks other than hairline cracks to a width of not less than 75 mm.
- Wash and brush exposed backgrounds and edges to remove dust and loose material.

566 REPAIRING EXISTING PLASTER:
- Remove plaster that is loose, soft, friable, badly cracked or affected by efflorescence. Gently tap all remaining intact surfaces and remove hollow sounding areas of plaster, unless otherwise agreed with the CA.
- Remove stained plaster to 300 mm beyond last point of visible staining, unless otherwise agreed with the CA.
- Cut back to straight horizontal and vertical edges.
- Advise CA if any built-in timbers, structural deficiencies or sources of damp are revealed.
- Thoroughly dry brush the background and edges to remove dust, loose material and efflorescence.

568 REPAIRING EXISTING DAMP AFFECTED PLASTER:
- Remove plaster on walls affected by rising damp up to a height of 300 mm above the highest point reached by the damp or 1 m above the dpc, whichever is higher.
- Rake out perished and salt contaminated mortar joints and cut out and renew any heavily salt contaminated bricks or blocks in the background.
- Advise CA if any built-in timbers, structural deficiencies or additional sources of damp are revealed.
- Provide the maximum ventilation possible and leave walls to dry for as long as possible before applying new plaster.
- Thoroughly dry brush background to remove dust, loose material and efflorescence.

573 TREATMENT OF ORGANIC GROWTHS: Biocides must be approved and registered by the Health and Safety Executive (HSE) and listed in the current 'Reference Book 500', as surface biocides.

581 ESTABLISH ORIGINAL PLASTER FACE:
- Removal of decorative finishes
- Before carrying out repairs to plasterwork ensure that decorative finishes and fillers have been removed from:
  Repair area(s) at junctions with new plasterwork.
  Decorative plasterwork before making any castings.
- Where paint coatings are suspected of containing lead, obtain instructions before proceeding.

587 REPAIRING TIMBER LATHS TO WALLS:
- Remove area(s) of defective plaster and laths being careful not to disturb adjacent sound plaster. Cut defective laths back to supporting timbers. Prevent plaster and laths from falling into voids.
- Ensure supports for laths are sound and firmly fixed. Where necessary provide or ensure provision of additional fixings, timber battens, etc.

589 REFIXING TIMBER LATHS THROUGH EXISTING PLASTER:

- Screw sound, loose laths and plasterwork gently back to supporting timbers using screws and washers recessed into plaster:
  Screws: 6mm x 50mm at 100 mm centres.
  Washers: 25 mm diameter inner washer and
  38 mm diameter fine mesh outer washers (mesh size 1.5 mm.)
  - Fill fixing recesses and finished flush with existing plaster surface.

592 REPAIRING TIMBER LATH AND PLASTER CEILINGS:

- Fully support area(s) of plasterwork to be repaired. Repair areas to be not more than 1 metre long x width of trough between joists. Ensure that each repair is dry and effective before commencing repairs to immediately adjacent areas.
- Cut through defective laths carefully along the sides of joists or, where laths are sound, cut through alternate laths. Remove cut laths. Carefully vacuum surface of plaster to remove debris and dust. Apply diluted PVAC sealer to control suction.
- Install metal lathing reinforcement angles as clause 593 in pairs opposite each other. Bed horizontal legs of angles in plaster of Paris on top of existing plaster with ends touching/overlapping those opposite. Screw vertical legs of angles securely to sides of joists with stainless steel screws and washers.
- Apply lengths of canvas wads soaked in plaster of Paris over metal lathing and existing plaster, to provide continuous and thorough bonding over the entire repair area. Cover the repair area with a coat of plaster of Paris sufficient to just cover the wadding.
- Provide additional support to horizontal legs of metal lathing angles over heavy decorative plasterwork. Span 9 mm diameter stainless steel rods, between and housed into, tops of joists. Suspend metal lathing from rods using stainless steel wire.

593 METAL LATHING REINFORCEMENT FOR REPAIRS TO TIMBER LATH AND PLASTER CEILINGS:

- Lathing type: (SUBMIT FOR ARCHITECT'S APPROVAL)
- Form into unequal angles:
  Vertical leg: Not less than 75 mm. Horizontal leg: Half the spacing between sides of joists plus 25 mm.

596 REPAIRING HOLES AND CRACKS IN PLAIN PLASTER ON TIMBER LATHS:

- Repair areas with missing or unsound laths as specified.
- Carefully cut away any loose plaster from around edges of holes or along lines of cracks. Do not disturb adjacent sound plaster.
- Remove all loose plaster and dust by brushing and vacuuming. Dampen laths and edges of plaster to control suction before applying (SUBMIT FOR ARCHITECT'S APPROVAL)

598 REPAIRING MINOR CRACKS IN PLASTERWORK.
Thoroughly brush cracks clean. Where necessary carefully cut back edges of plaster either side of cracks to produce a firm edge. Lightly dampen cracks to control suction, fill with (SUBMIT FOR ARCHITECT'S APPROVAL) and finish flush with surrounding plaster. For decorative plasterwork, ensure that surface profiles/patterns are continued accurately.

599 REPAIRING FINAL COAT PLASTER ON SOUND UNDERCOAT:

- Carefully remove area(s) of loose or flaking final coat plaster. Brush clean background plaster to repair area and apply PVAC sealer to control suction.
- Final coat plaster: (SUBMIT FOR ARCHITECT'S APPROVAL)

BACKINGS/BEADS/JOINTS

620 Plasterboard BACKINGS:
- Board manufacturer and reference: British Gypsum Ltd. – As indicated on drawing No. CT 156
  Thickness: As Indicated.
- Adhesive manufacturer and reference: British Gypsum Ltd. – As indicated
- Ensure that background is clean, dry and free from dust, efflorescence and mould.
- Bed boards in a continuous coating of adhesive to give a flat surface, true to line and level and free from ridges, leaving a 3 mm gap between boards.
- Protect from damage and apply coatings as soon as practicable.

630 BEADS/STOPS FOR INTERNAL USE:
Galvanized steel to **IS EN 13658 part 1.**

632 BEADS/STOPS FOR INTERNAL USE:
- Material:British Gypsum Ltd.
- Manufacturer and reference: British Gypsum Ltd. Thistle thin coat Beads.

635 BEADS/STOPS FOR EXTERNAL USE:
- Material: Galvanized steel.
  Coating designation: At least Z275 to BS EN 10142.
  Nosing sheaths: **(SUBMIT FOR ARCHITECT'S APPROVAL)**
- Manufacturer and reference: **(SUBMIT FOR ARCHITECT'S APPROVAL)**

636 BEADS/STOPS FOR EXTERNAL USE:
- Material: Stainless steel.
  Corrosion resistance: At least equal to grade 304 of BS 1449:Part 2.
- Manufacturer and reference: As Recommended by the Render system Manufacturer.

638 ARCH FORM METAL LATHING:
- Materials: Galvanised Steel
- Manufacturer and reference: Expamet Ltd.

640 BEADS/STOPS GENERALLY:
- Provide beads/stops at all external angles and stop ends except where specified otherwise.
- Cut neatly, form mitres at return angles and remove sharp edges, swarf and other potentially dangerous projections.
- Fix securely, using the longest possible lengths, plumb, square and true to line and level, ensuring full contact of wings with background. Use mechanical fixings for external beads/stops.
- After coatings have been applied, remove coating material while still wet from surfaces of beads/stops which are to be exposed to view.

645 DISSIMILAR SOLID BACKGROUNDS FOR PLASTERING: Where plaster is to be continued without break and without change of plane across the face of a column/beam/lintel which is not wider than 450 mm and is rigidly bonded or tied to the surrounding background:
- Cover the face of the column/beam/lintel with building paper to BS 1521 extending not less than 25 mm on to the adjacent background.

- Overlay with expanded Stainless steel lathing extending not less than 100 mm beyond the edges of the paper. Orientate lathing in accordance with manufacturer's recommendations and fix securely at 300 mm staggered centres along both edges using manufacturer's recommended fixings.

648 DISSIMILAR SOLID BACKGROUNDS FOR PLASTERING/ RENDERING: Where coating is to be continued without break across joints between dissimilar solid backgrounds which are in the same plane and rigidly bonded or tied together, cover joints with a 150 mm wide strip of building paper to BS 1521 and overlay with 300 mm wide expanded Stainless steel lathing. Orientate lathing in accordance with manufacturer's recommendations and fix securely at 300 mm staggered centres along both edges using manufacturer's recommended fixings.

650 MOVEMENT JOINTS:
- Form joints in coatings to coincide with movement joints in background using: Back to Back Render Beads.
- Ensure that joints extend through coating to background.

655 CONDUITS bedded in undercoat to be covered with
100 mm wide joint tape bedded in finishing coat mix, pressed flat and trowelled in. Do not lap ends of tape.

659 TAPING JOINTS: Fill and tape (scrim) the joints between boards (except where coincident with a metal bead):
Bed tape centrally over joints using same plaster as following coat. Do not lap ends. Press well in, trowel flat and smooth and allow to set but not dry out before applying coating.

662 JOINTS BETWEEN BOARDS AND SOLID BACKGROUNDS that are both to be plastered: Fill and tape (scrim) unless specified otherwise.

666 PLASTIC COMPOUND FINISH: Where boarded ceilings are to be coated with plastic compound finish, brush apply a 40 mm wide band of sealer recommended by plastic compound manufacturer to perimeter edges of ceilings. Allow to dry before applying wall plaster.

673 SERVICE CHASES: Cover with galvanized steel mesh strip fixed securely at 300 mm staggered centres along both edges.

MOULDINGS/DECORATIVE PLASTERWORK

PLASTERING

710 APPLICATION GENERALLY:
- Apply each coating firmly to achieve good adhesion and in one continuous operation between angles and joints.
- All coatings to be not less than the thickness specified, firmly bonded, of even and consistent appearance, free from rippling, hollows, ridges, cracks and crazing.
- Finish surfaces to a true plane, to correct line and level, with all angles and corners to a right angle unless specified otherwise, and with walls and reveals plumb and square.
- Prevent excessively rapid or localised drying out.

715 ACCURACY of plaster 13 mm thick or more: The variation in gap under 1.8 m straight edge (with feet) placed anywhere on the surface to be not more than 3 mm.

718 JUNCTION OF NEW PLASTERWORK WITH EXISTING:
Finish new plasterwork flush with the original face of existing work to form a seamless junction.

720 DUBBING OUT: If necessary to correct background inaccuracies, dub out in thicknesses of not more than10 mm in same mix as first coat. Allow each coat to set sufficiently before the next is applied. Cross scratch surface of each dubbing out coat.

721 DUBBING OUT will not be permitted on smooth dense concrete surfaces except as recommended by the plaster manufacturer.

726 METAL MESH LATHING: Work undercoat well into interstices to obtain maximum key.

731 UNDERCOATS GENERALLY: Apply firmly, rule to an even surface and cross scratch each coat to provide a key for the next coat.

734 CEMENT GAUGED UNDERCOATS: Allow to dry out thoroughly, but not too rapidly, to ensure that drying shrinkage is substantially complete before applying next coat.

737 GYPSUM/LIGHTWEIGHT PLASTERS: Apply final coat as soon as undercoat has set, is firmly bonded to background and has developed reasonable suction.

739 LIGHTWEIGHT CEMENT BASED PLASTER: Apply a tight coat to adjust suction (incorporating approved bonding agent for low suction backgrounds) and apply floating coat without delay.

742 THIN COAT PLASTER: Before applying single coat plaster of less than 2 mm thickness, prepare surface by filling holes, scratches and voids with finishing plaster.

747 PROJECTION PLASTER: Apply evenly and in one continuous operation between angles and joints. Spread to a level open textured surface, filling any hollows by respraying. Wet surface with a fine spray before trowelling to a smooth finish.

752 X-RAY PLASTER:
- Use temporary grounds to ensure application to the specified thickness.
- Do not adulterate with any other materials.
- Finished plasterwork to be completely free from cracks at end of Defects Liability Period.

757 SQUASH COURT PLASTER: Apply each coat in one continuous operation to each complete wall face, the final coat being applied within 48 hours of applying undercoat.

767 DISSIMILAR BACKGROUNDS: Where tape (scrim) or lathing or beads are not specified, cut through plaster with a fine blade in a neat, straight line at junctions of:
- Plastered rigid sheet and plastered solid backgrounds
- Dissimilar solid backgrounds.

777 SMOOTH FINISH: Trowel or float to produce a tight, matt, smooth surface with no hollows, abrupt changes of level or trowel marks. Do not use water brush and avoid excessive trowelling and over polishing.

778 WOOD FLOAT FINISH: Finish with a dry wood float as soon as wet sheen has disappeared from surface to give an even overall texture.

782 TEXTURED/PATTERNED FINISH(ES) to be consistent and even. Carry out the work on each surface as one continuous operation. Use only one operative if necessary to avoid variations in technique which may result in differences of appearance, especially under oblique lighting.

786 TIMBER LATHING: Apply undercoat with sufficient pressure to force it between laths and form continuous keys.

788 NONHYDRAULIC LIME PLASTER UNDERCOATS:
- Dampen background to control suction.
- Apply plaster firmly and trowel to an even surface. Allow to stiffen and cross scratch to provide an undercut key for the next coat. Do not penetrate through the coat. After completion of consolidation/scouring, lightly scratch the second undercoat using a wood 'devil' float to provide a key for the final coat.

789 THREE LAYER NONHYDRAULIC LIME PLASTER FINAL COAT:
- Remove any dust from undercoat and dampen to control suction.
- Apply first layer with a steel trowel. Apply second layer with a wood float in the opposite direction to the first layer. Apply third layer with a steel trowel in the same direction.
- Thoroughly consolidate/scour the plaster with a wood cross grain float. Dampen the surface using a stock brush and polish with a steel trowel. Finish with a damp stock brush.

791 DRYING OF NONHYDRAULIC LIME PLASTER:
- Work in the shade and out of drying winds.
- Keep each undercoat and final coat damp by spraying with water until coating is sufficiently firm.
- Thoroughly consolidate/scour second and final coats one or more times as necessary to control shrinkage.

RENDERING

810 APPLICATION GENERALLY:
- Apply each coating firmly to achieve good adhesion and in one continuous operation between angles and joints.
- All coatings to be not less than the thickness specified, firmly bonded, of even and consistent appearance, free from rippling, hollows and ridges.
- Finish surfaces to a true plane, to correct line and level, with all angles and corners to a right angle unless specified otherwise, and with walls and reveals plumb and square.
- Prevent excessively rapid or localised drying out.

815 ACCURACY of rendering to receive tiles fixed with adhesive. The variation in gap under a 1.8 m straight edge (with feet) placed anywhere on the surface to be not more than 3 mm.

820 DUBBING OUT:
- If necessary to correct background inaccuracies dub out in thicknesses of not more than 13 mm in same mix as undercoat. Total thickness of dubbing must not exceed 25 mm unless approved otherwise.
- In areas where thickness of dubbing will exceed 20 mm, first apply an approved keying/bonding treatment.
- Comb surface of each dubbing out coat. Allow each coat to set but not dry before the next is applied.

830 ANCHORED MESH REINFORCEMENT: The first undercoat must be applied through and round the mesh to fully bond with the solid background.

840 UNDERCOATS GENERALLY:
- Apply first undercoat or dubbing out coat by throwing from a trowel.
- Allow to stiffen and comb to provide a key for the next coat. Comb to produce evenly spaced wavy horizontal lines, approximately 20 mm apart and 5 mm deep. Do not penetrate through the coat.
- Brush down each undercoat to remove dust and loose particles and dampen to control suction before applying next coat.

845 THROWN UNDERCOATS FOR LIME BASED ROUGHCAST (HARLING): Apply undercoat(s) and any dubbing out coat by throwing from a casting trowel or scoop. Press back undercoats as necessary to give an even coating thickness without smoothing the surface.

856 FINAL COAT - PLAIN FLOATED FINISH: Finish with wood or other suitably faced float to give an even, open texture. Do not apply water while working up. Do not draw excessive laitance to surface (either by overworking or by use of steel trowel).

861 FINAL COAT - SCRAPED FINISH: After coating has set but before it is too hard, expose aggregate by scraping surface skin to an even texture with a saw blade.

866 FINAL COAT - ROUGHCAST (HARLING) FINISH: Throw on with a trowel or scoop to an even thickness and texture and leave as cast.

869 BUTTER COAT FOR ROUGHCAST (HARLING) FINISH: Where preferred to aid adhesion, apply a thin butter coat immediately before throwing the roughcast final coat. Butter coat mix: As for previous undercoat.

871 FINAL COAT - DRY DASH FINISH:
- Aggregate: single size _____ chippings to BS 63:Part 2, to pass a ___ mm sieve and be retained on a ___ mm sieve.
- While coating is plastic, throw on well washed wet aggregate to cover the surface.
- Tap particles lightly into mortar with flat of trowel to ensure adhesion, working continuously over the face to give an even overall effect.

880 DRYING:
- Work in the shade and out of drying winds whenever possible.
- Keep each undercoat and final coat damp for the first 3-4 days by covering with polyethylene sheet and/or spraying with water. Hang sheeting clear of the final coat where it is the final finish. Thereafter prevent from drying out too rapidly.
- Allow each coat to dry out thoroughly to ensure that drying shrinkage is substantially complete before applying next coat.

885 DRYING OF NONHYDRAULIC LIME RENDER:
- Work in the shade and out of drying winds whenever possible.
- Keep each undercoat and final coat damp by covering with _____ and spraying with water until coating is sufficiently firm. Hang sheeting clear of coatings.
- Thoroughly consolidate/scour each coat one or more times as necessary to control shrinkage.

890 PROTECTION: Adequately protect newly applied external coatings against frost and rain for the first 48 hours using polyethylene sheet hung clear of the face, or other approved method.

WATERPROOF RENDERING

910 BACKGROUND to be soaked thoroughly immediately before applying coatings. Remove puddles and other standing water.

915 LEAKS: Cut out cracks, porous patches and other defective areas in backgrounds subject to water pressure and liable to admit water. Fill cracks, holes and hollows using materials and methods recommended by waterproofing compound manufacturer to stop all leaks.

920 FIXING POINTS: Holes for fasteners to be formed and sealed in accordance with waterproofing compound manufacturers' recommendations before coatings are applied. Do not make any holes after coatings have been applied.

930 COATINGS:
- Prepare and apply in accordance with waterproofing compound manufacturer's recommendations.
- Apply each coat in one continuous operation wherever possible to avoid joints. Where joints cannot be avoided agree positions with CA before starting work.
- Ensure that joints in successive coats do not occur at angles, and are staggered by at least 100 mm. Splay the edges and overlap adjacent coatings by at least 100 mm.
- Check each coating for continuity. Patch pinholes, other breaks and thin areas before applying next coat.
- Do not cross scratch coatings to form a key.

935 INTERNAL ANGLES: Form fillets of waterproof coating mix after first coat has been applied. Form smooth round coves after final coat has been applied.

940 FINISH with a wood or other suitably faced float to give an even texture. Do not apply water to final coat while working up. Do not draw excessive laitance to surface (either by overworking or by use of steel trowel).

M30 METAL MESH LATHING/REINFORCEMENT FOR PLASTERED COATINGS

To be read with Preliminaries/General conditions.

TYPE(S) OF LATHING/REINFORCEMENT

110 LATHING:
- Background: Timber
- Lathing: BS.1369 Part 1 zinc coated reference L1 fixed with staples at 150 mm centres as clause 410.
Manufacturer and reference: Approved type and manufacturer.

INSTALLATION

270 FIRRINGS:
Timber supports more than 75 mm wide to have 22 mm x 6 mm hardwood furrings fixed before fixing plain expanded metal lathing

310 BUILDING PAPER:
- Water resistant breather type to B.S.4106
- Starting from the bottom, fix with clout nails or staples in horizontal lengths, with 100 mm laps.

410 PLAIN EXPANDED METAL LATHING:
- Stretch lathing and fix securely in accordance with manufacturer's recommendations to give a taut, firm base for plaster/rendering.
- Fix with the long way of the mesh at right angles to supports and with all strands sloping in the same direction.
- Lap side edges not less than 25 mm. Lap ends 50 mm at supports and 75 mm between supports. Laps must not occur within 100 mm of angles or bends.
- Tie all edges and ends together with 1.2 mm wire ties at not more than 150 mm centres.

420 RIBBED LATHING:
- Fix securely as specified to give a taut, firm base for plaster/ rendering.
- Fix with all strands sloping in the same direction, with ribs at right angles to supports and apexes bearing on the supports.
- Lap side ribs of adjacent sheets, press well together and secure with 1.2 mm wire ties or punch fix together at not more than 150 mm centres.
- Lap ends of sheets at supports wherever possible and not less than 50 mm. Where unavoidable between supports, lap ends 100 mm. Laps must not occur within 100 mm of angles or bends.
- Tie all edges and ends together with 1.2 mm wire ties at not more than 150 mm centres along edges and at each rib along ends. Tie end laps between supports with two rows of ties at not more than 100 mm centres.

430 WELDED MESH AND PAPER LATHING:
- Stretch lathing and fix securely as specified to give a taut, firm base for plaster/rendering.
- Fix with long dimension of sheets at right angles to supports and cross joints staggered.
- Commence fixing to walls at bottom right hand corner, working upwards and from right to left.
- Lap edges and ends a minimum of one full mesh. Laps must not occur between supports, at angles, or in line with edges of openings.

450 ANCHORED MESH REINFORCEMENT:
- Any necessary dubbing out must be completed before fixing reinforcement.
- Fix mesh as specified with horizontal wires outwards, positioning fastenings where two wires cross.
- Space inner wires away from backing with a 4 mm thick stainless steel or plastics washer placed on each fastening.
- Secure reinforcement to fastenings with 1.2 mm stainless steel wire ties or by cramping with stainless steel washers placed on each fastening on the inner and outer faces of the mesh.

460 LATHING ON SOLID BACKINGS: Fix securely as specified, with increased length and frequency of fastenings as necessary in weak areas. Inform CA before applying plaster/rendering.

M50 RUBBER/PLASTICS/CORK/LINO/CARPET TILING/ SHEETING

To be read with Preliminaries/General conditions and to comply with the following codes and standards where applicable.

I.S. EN ISO 10874 - Resilient, Textile And Laminate Floor Coverings – Classification.
BS 8203 2001 + A1 2009: Code of Practice For Installation of Resilient Floor Coverings.
Other codes or standards referenced herein
Irish Building Regulations

TYPE(S) OF COVERING

150 SINGLE SHEET VINYL/MARMOLEUM FLOORING:
- Location: As Indicated. Drawing No. CT 149.
- Base: As Indicated. Drawing No. CT 165.
  Preparation: As Indicated.
- Fabricated underlay: As Indicated.
- Flooring roll: As Indicated.
  Manufacturer and reference: As Indicated.
  I.S. EN ISO 10874 class As Indicated.
  Thickness: 2.5mm.
  Colour/pattern: As Indicated.
- Adhesive (and primer if recommended by manufacturer):
  As Indicated.
- Seam welding As Indicated.
- Accessories: As Indicated.
- Finishing: As Indicated.
- Special requirements: As Indicated.

GENERALLY

210 WORKMANSHIP GENERALLY:
- All bases must be rigid, dry, sound, smooth and free from grease, dirt and other contaminants before coverings are applied.
- Finished coverings must be accurately fitted, tightly jointed, securely bonded, smooth and free from air bubbles, rippling, adhesive marks and stains.

220 SAMPLES: Before placing orders, submit for approval a representative sample of each type of covering. Ensure that delivered materials match samples.

230 CONTROL SAMPLE: Complete areaof the finished work in approved locationa, and obtain approval of appearance before proceeding:

250 LAYOUT: Agree setting out of seams before ordering roll materials for sheeting type(s) M50/___

251 LAYOUT: Set out sheet coverings so that seams and cross seams are kept to a minimum. Cross seams will not be permitted.

252 LAYOUT: Agree setting out of pattern before ordering materials for covering type(s) M50/___

270 EXTRA MATERIAL: Provide 10% extra of each type of covering to be handed over to the Employer at completion.

310 MARKING: Ensure that materials are delivered to site in original packing, clearly marked with batch number.

320 STORAGE: Store materials in a clean, warm, dry, well ventilated place. Keep in original packing until conditioning commences.

330 COMMENCEMENT: Do not lay materials until building is weathertight, wet trades have finished their work, the building is well dried out, all paintwork is finished and dry, conflicting overhead work completed, and floor service outlets, duct covers and other fixtures around which the materials are to be cut have been fixed. Inform CA not less than 48 hours before commencing laying.

340 CONDITIONING: Before laying commences thoroughly condition materials by unpacking and separating in the spaces where they are to be laid. Maintain resilient flooring rolls in an upright position, unroll carpet and keep flat on a supporting surface. Minimum conditioning time and temperature to be as recommended by manufacturer. Extend period by a factor of 2 for materials stored or transported at a temperature of less than 10°C immediately prior to laying.

350 ENVIRONMENT: Before, during and after laying, provide adequate ventilation and maintain temperature and humidity approximately at levels which will prevail after the building is occupied.

360 UNDERFLOOR HEATING: Do not commence laying on floors with underfloor heating for a period of 48 hours after the heating has been turned off. Slowly return heating to its operative temperature not less than 48 hours after completing laying.

PREPARING BASES

410 SUITABILITY OF NEW BASES AND CONDITIONS: Laying of coverings will be taken as joint acceptance by the Main Contractor and Subcontractor of the suitability of the bases and conditions within any given area.

420 SUITABILITY OF EXISTING BASES AND CONDITIONS:
- Before commencing work the subcontractor must confirm (through the Main Contractor) that existing bases will, after the specified preparation, be suitable to receive the specified coverings.
- Laying of coverings will be taken as further acceptance of the suitability of the bases and also of the conditions within any given area.

430 DAMPNESS: Where coverings are to be laid on new wet-laid bases:
- Ensure that drying aids have been turned off for not less than 4 days, then
- Test for moisture content using an accurately calibrated hygrometer in accordance with BS 5325, Annexe A or BS 8203, Annexe A.
- Take readings in all corners, along edges, and at various points over the area being tested.
- Do not lay coverings until all readings show 75% relative humidity or less.

440 SUBSTRATES: The specifications for trowelled finishes to receive thin floor coverings require:
- A uniform, smooth surface free from trowel marks and other blemishes, and suitable to receive the specified floor finish material.
- Adequate protection from construction traffic.

- Allowance for making good by application of a smoothing compound by and to the satisfaction of the flooring subcontractor in the event of the surface being unsuitable due to inadequate finishing or protection.

460 SMOOTHING UNDERLAYMENT COMPOUND: As Indicated & recommended for the purpose by the manufacturer. Mix and lay in accordance with manufacturer's recommendations.

470 EXISTING FLOOR COVERING TO BE REMOVED: Completely remove covering and as much adhesive as possible. Skim with smoothing underlayment compound to give a smooth, even surface.

480 EXISTING FLOOR COVERING TO BE OVERLAID: Make good by local resticking and patching or filling with smoothing underlayment compound to give a smooth, even surface.

LAYING COVERINGS

610 SET OUT TILES from centre of space/room unless specified otherwise, so that wherever possible:
- Tiles along opposite edges are of equal size, and
- Edge tiles are more than 50% of full tile width.

620 COLOUR CONSISTENCY: In any one area/room use only coverings from the same production batch to prevent banding or patchiness resulting from colour/flash variation.

630 HEATING OF TILES, when recommended by manufacturer, to be carried out in accordance with manufacturer's recommendations. Do not overheat.

640 ADHESIVE FIXING GENERALLY:
- Adhesive: when not specified otherwise, type to be as recommended by covering/underlay manufacturer as appropriate or, in the absence of such recommendation, type to be approved.
- Use a primer where recommended by adhesive manufacturer. Allow to dry thoroughly before applying adhesive.
- Spread adhesive evenly and lay covering, pressing down firmly and rolling laterally and transversely (if recommended) to ensure full contact and a good bond overall. Reroll (if recommended) within 30 minutes.
- Remove all surplus adhesive from exposed faces of coverings as the work proceeds.
- Trowel ridges and high spots caused by particles on the substrate will not be accepted.

650 PATTERNS to be accurately matched at seams.

660 SEAMS to be cut in to ensure a tight joint, without gaps.

670 BORDERS/FEATURE STRIPS of sheet material:
- Cut strips along the length of the sheet to prevent curl.
- Mitre joints at corners.

680 SEAM WELDING:
- Do not commence welding of coverings until a minimum of 24 hours after laying or until adhesive has completely set.
- Form a neat, smooth, strongly bonded joint, flush with finished surface.

720 DOORWAYS: Make joint on centre line of door leaf unless specified otherwise.

740 EDGINGS/COVER STRIPS:
- Manufacturer and reference(s): Gradus As Indicated. Drawing CT 149 Material/finish:Adonised Aluminium.
- Fix securely (using matching fasteners where exposed to view) ensuring that edge of covering is firmly gripped.

770 Vinyl / Marmoleum SKIRTINGS:
- Manufacturer and reference(s):As Indicated.
- Securely bond with top edge straight and parallel with floor. Accurately mitre at corners.

770 Hardwood SKIRTINGS:
- Manufacturer and reference(s): As Indicated.
- Securely bond with top edge straight and parallel with floor. Accurately mitre at corners.

780 TRAFFIC: After laying, keep floor covering type(s) M50 free from traffic for period as recommended in manufacturers current written instructions.

COMPLETION

810 CLEANING GENERALLY: Remove all scrap, dust and dirt. Carefully remove adhesive and other marks from coverings and adjacent surfaces, using approved cleaning agents and methods.

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825 FINISHING SHEET FLOORING:
- Wash floor using mops dampened with water containing neutral (ph 6-9) detergent. If necessary, lightly scrub heavily soiled areas using a brush or synthetic fibre web pad.
- Thoroughly rinse with clean water, removing surplus to ensure no damage to adhesive, and allow to dry for not less than 24 hours before testing.

870 PROTECTION: Cover flooring with clean dust sheets, or other nonstaining suitable material to prevent damage from dirt and traffic prior to Practical Completion. Ensure any material with printed information on one face is laid with printed face uppermost.

880 WASTE: Retain spare covering material suitable for patching. On completion hand over to Employer pieces selected by CA.

M60 PAINTING/CLEAR FINISHING

To be read with Preliminaries/General conditions.

COATING SYSTEMS

110 Wall Coatings – Drawing **CT 156**
- Manufacturer: Dulux or similar approved
- Surface(s): Skimmed Plasterboard walls.
  Preparation: As Indicated
- Initial coat(s): As Indicated
- Finishing coats: As Indicated

111 Ceiling Coatings – Drawing CT 156
- Manufacturer: Dulux or similar approved
- Surface(s): Skimmed Plasterboard ceilings.
  Preparation: As Indicated
- Initial coat(s): As Indicated
- Finishing coats: As Indicated

112 Woodwork Coatings – Drawing CT 156
- Manufacturer: Dulux or similar approved
- Surface(s): Architraves, Skirtings etc.
  Preparation: As Indicated
- Initial coat(s): In accordance with manufacturers current written instructions.
- Finishing coats: 2 coats Lacquered finish.

GENERALLY

210 COATING MATERIALS to be obtained from one only of the following manufacturers unless specified otherwise. Inform the CA of selected manufacturer before commencement of any coating work.
Dulux.

215 HANDLING AND STORAGE:
- Coating materials must be delivered in sealed containers, each clearly labelled with the brand name, type of material and manufacturer's batch number.
- Wherever possible materials must be from one manufacturing batch. Inform the CA if materials from more than one batch are to be used, store separately and allocate to distinct parts or areas of the work.
- Store materials in accordance with manufacturer's recommendations. Use in order of delivery and before expiry of any shelf life date.

220 COMPATIBILITY:
- Check that all 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.
- Where surfaces have been treated with preservatives or fire retardants, check with treatment manufacturer that coating materials are compatible with the treatment and do not inhibit its performance.
- Inform the CA of any discrepancy in specification of coatings and obtain instructions before proceeding with application.

230 ANCILLARY SURFACES: The descriptions of areas to be coated given in schedules, etc. are of necessity simplified. All ancillary exposed surfaces and features are to be coated to match similar or adjacent materials or areas except where a fair faced natural finish is required or items are completely prefinished. In cases of doubt obtain instructions before proceeding.

240 SURFACES NOT TO BE COATED:
As indicated on the Architectural drawings.

250 SURFACES TO BE CLEANED BUT NOT COATED:
Pre-coated surfaces – Windows etc.

270 OFF SITE WORK:
- All off site preparation and coating to be carried out under cover in a suitable environment with adequate lighting.
- Store all items, both before and after coating, in a clean, dry area protected from the weather and mechanical damage, properly stacked with spaces to permit air circulation and prevent sticking of surfaces.

280 PROTECTION:
- Adequately protect internal and external surfaces, fixtures and fittings which are not to be coated, by covering with dust sheets, masking or other suitable materials.
- Exhibit 'Wet paint' signs and provide barriers where necessary to protect other operatives and the general public, and to prevent damage to freshly applied coatings.

290 TESTING OF VISCOSITY, ETC: The CA may, with discretion, take samples of materials from each manufacturing batch as follows:
- Unopened containers, or samples from previously unopened containers, for submission to manufacturer for comparison with manufacturer's own retained samples from the same batch.
- Unopened containers, or samples from previously unopened containers, as a control sample for assessment of samples taken from painters' kettles.
- Samples from painters' kettles for submission with control sample to manufacturer and/or independent testing laboratory for comparative testing.

300 CONTROL SAMPLE(S): Prepare sample areas of the finished work, including preparation, in advance of the remainder. Obtain approval of appearance before proceeding.

320 INSPECTION OF WORK: Permit coating manufacturers to inspect the work in progress and take samples of their products from site if requested.

321 INSPECTION OF WORK: Inspection of the whole of the work at each of the stages set out below may be made, at the discretion of the CA. Agree with the CA a programme which will facilitate such inspections and notify him when each part and stage of the work is ready for inspection. Do not proceed with subsequent stages of the work until authorised.

PREPARATION

400 PREPARATION GENERALLY:
- To BS 6150, Section 4.
- Materials used in preparation must be types recommended by their manufacturers and the coating manufacturer for the situation and surfaces being prepared.
- Prevent or control exposure of operatives to dust, vapour and fumes exceeding occupational exposure standards set in the current Health and Safety Executive (HSE) document EH40.
- Substrates must be sufficiently dry in depth to suit the coating to be applied.
- Remove efflorescence salts from surfaces. Repeat removal if efflorescence recurs.
- Clean off dirt, grease and oil from surfaces. If contamination of surfaces/substrates has occurred, obtain instructions before proceeding.

- Smooth surface irregularities. Fill joints, cracks, holes and other depressions with stoppers/fillers worked well in and finished off flush with surface. Abrade to a smooth finish.
- 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.
- Remove dust and particles from dry abrasive preparation of surfaces.
- Remove residues from wet preparation of surfaces by rinsing with clean water, wiping and allowing to dry.
- Ensure that doors, 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 the Painting Contractor of the suitability of surfaces and conditions within any given area to receive the specified coatings.

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

425 IRONMONGERY: Remove from surfaces to be coated and refix on completion. Do not remove hinges unless instructed to do so.

430 IRONMONGERY: Remove all old paint and varnish marks from existing ironmongery. Thoroughly clean and polish before refixing.

440 PREVIOUSLY COATED SURFACES GENERALLY:
- Prepare in accordance with BS 6150, Section 6.
- When removing or partially removing coatings, use methods which will not damage the substrate or adjacent surfaces or adversely affect subsequent coatings.
- Carefully remove all loose, flaking or otherwise defective areas to a firm edge.
- Completely remove alkali affected coatings.
- Where coatings are suspected of containing lead, obtain instructions before proceeding.
- Where substrates containing asbestos are revealed, obtain instructions before proceeding.
- Where significant rot, corrosion or other degradation of substrates is revealed, obtain instructions before proceeding.
- Thoroughly clean retained coatings with appropriate detergent solutions or solvents to remove all dirt, grease and contaminants. Abrade gloss coated surfaces when still wet to provide a key.
- Apply additional preparatory coats to areas of partial removal to restore original coating thicknesses. Abrade junctions to give a flush surface.
- Where coatings are completely removed, prepare surfaces as specified for uncoated surfaces.

451 PREVIOUSLY COATED SURFACES - BLAST CLEANING: To be carried out by specialists using abrasives and pressures appropriate to the substrate. Take all necessary precautions to minimise dust and nuisance.

461 PREVIOUSLY COATED TIMBER:
- Remove any degraded or weathered surface timber by abrading.
- Ensure that repairs to degraded substrate timber have been carried out with sound timber of the same species.
- Apply two coats of knotting to exposed resinous areas and knots and allow to dry.

471 PREPRIMED TIMBER: Abrade chalking, powdery and other defective primer back to bare timber, remove dust and reprime resulting bare areas.

481 UNCOATED TIMBER:
- Abrade to a smooth, even finish with arrises and moulding edges lightly rounded or eased.
- Ensure that heads of fasteners are countersunk sufficiently to hold stoppers/fillers.
- Apply two coats of knotting to resinous areas and knots and allow to dry.

490 PREVIOUSLY COATED STEEL:
- Abrade corrosion and loose scale back to bare metal.
- Treat any residual rust with a proprietary removal solution. Prime as soon as possible.

500 PREPRIMED STEEL: Abrade defective primer, corrosion and loose scale back to bare metal, remove dust and reprime resulting bare areas.

511 GALVANIZED, SHERARDIZED AND ELECTROPLATED STEEL to receive lead free primer: Pretreat with 'T wash'/mordant solution to achieve blackening of the whole surface or apply pretreatment etching primer where recommended by the coating system manufacturer.

521 UNCOATED STEEL - MANUAL CLEANING:
- Remove oil and grease.
- Abrade to remove corrosion, loose scale, welding slag and spatter.
- Treat any residual rust with a proprietary removal solution. Prime as soon as possible.

531 UNCOATED STEEL - BLAST CLEANING:
- Remove oil and grease.
- Blast clean in dry atmospheric conditions using abrasive of suitable type and size, free from fines, moisture and oil. Continue blasting until surface complies with BS 7079: Part A1, preparation. Prime surface as soon as possible after blast cleaning and in any case within four hours.

541 UNCOATED ALUMINIUM/COPPER/LEAD: Remove any surface corrosion/oxidization and lightly abrade with fine abrasive paper and white spirit. Apply pretreatment etching primer where recommended by the coating system manufacturer.

552 UNCOATED PVC-U: Wash with warm detergent solution to remove dirt and grease. Do not abrade.

560 UNCOATED CONCRETE: Remove release agents with detergent/emulsion solutions. Ensure that major surface defects are repaired.

570 UNCOATED MASONRY/RENDERING: Remove loose and flaking material with a stiff brush.

580 UNCOATED PLASTER: Scrape off nibs, trowel marks and plaster splashes. Abrade lightly any overtrowelled 'polished' areas.

590 UNCOATED PLASTERBOARD: Fill depressions around fixings.

601 UNCOATED PLASTERBOARD - TO RECEIVE TEXTURED COATING: Fill joints, tape and feather out using materials recommended by the textured coating manufacturer.

611 WALLPAPERS/WALLCOVERINGS:
- Ensure that wallpapers/wallcoverings to be retained are in good condition and well adhered to the substrate.

- Where wallpapers/wallcoverings have been removed, wash down surface of substrate with detergent solution to remove paper residues, adhesive and size.

622 TREATMENT OF ORGANIC GROWTHS:
- Remove all loose growths and infected coatings/decorations.
- Apply appropriate biocidal solution to growth areas and surrounding surfaces.
- Scrape or brush off all dead growth. Remove infected materials immediately to ensure that no other areas become infected.
- Apply appropriate residual effect biocidal solution to inhibit re-establishment of growths.
- Biocides must be approved and registered by the Health and Safety Executive (HSE) and listed in the current 'Reference Book 500', Part B, as surface biocides.

631 PREVIOUSLY PAINTED WINDOW FRAMES:
- Remove existing paint to the extent specified or instructed.
- Remove old paint splashes and old paint encroaching beyond the glass sight line.
- Remove loose and defective putty.
- Thoroughly clean putty cavities and junctions between previously painted surfaces and glass.
- Patch prime, reputty and paint as soon as sufficiently hard.

640 POINTING TO EXISTING FRAMES:
- Remove defective sealant pointing.
- Thoroughly clean the joint recess, remove all dust and seal joint surfaces as recommended by sealant manufacturer.
- Check that depth of joint is approximately half its width, and adjust using recommended backing strip if necessary.
- Repoint neatly using mastic gun during dry conditions when the ambient temperature is above 5degC.
- Sealant manufacturer and reference: Adshead Ratcliffe & Co Ltd - Arbosil 1090

651 EXISTING GUTTERS: Clean all dirt and debris from inside of gutters before preparing and coating. Clean out defective joints and seal with approved jointing material.

652 EXISTING GUTTERS: Clean all dirt and debris from inside of all gutters (even though not to be coated). Clean out defective joints and seal with approved jointing material.

APPLICATION

700 UNSUITABLE CONDITIONS:
- Take all necessary precautions including restrictions on working hours, providing temporary protection and allowing extra drying time, to ensure that coatings are not adversely affected by climatic conditions during and after application.
- Prevent or control exposure of operatives to solvent vapour levels exceeding occupational exposure standards set in the current Health and Safety Executive (HSE) document EH40.
- Unless it is specifically permitted by the coating manufacturer, do not apply coatings:
    - To surfaces affect by moisture, frost or airborne dust.
    - When the air or substrate temperature is below 5degC.
    - When the relative humidity is above 80%.
    - When heat is likely to cause blistering or wrinkling.

711 COATING GENERALLY:
- To BS 6150, Section 5.

- Do not use materials which show any bittiness or other defects when applied. Do not thin or intermix unless specified or recommended otherwise.
- Apply priming coats as soon as possible on the same day as preparation is completed. They must be of adequate thickness and suit surface porosity.
- Apply coatings by brush or roller unless otherwise specified or approved.
- Keep brushes and equipment in a clean condition. Dispose safely of cleaning and waste materials, do not pour into sanitary appliances or drains.
- Subsequent coats of the same pigmented material must be of a different tint to ensure that each coat provides complete coverage.
- Apply coatings to clean, dry surfaces in accordance with the manufacturer's recommended intervals between coats.
- Apply coatings evenly to give a smooth finish of uniform colour, free from brush marks, sags, runs and other defects. Cut in neatly and cleanly. Do not splash or mark adjacent surfaces.
- Adequately protect drying and completed work from damage.

720 PRIMING JOINERY:
- Before priming preservative treated timber ensure that any cut surfaces have been retreated and that all preservatives are completely dry.
- Liberally coat all end grain, allow to soak in and then recoat.

730 CONCEALED JOINERY SURFACES: Where one or more additional coats are specified to be applied in the factory, they must be applied to all surfaces, including those which will be concealed when components are fixed in place.

751 STAINING TIMBER:
- Apply primer where recommended by the stain manufacturer.
- Apply stain in flowing coats. Brush out excess stain before set to produce uniform depth of colour.

760 VARNISHING: Thin first coat with white spirit in accordance with manufacturer's recommendations. Brush well in avoiding aeration and lay off. Apply further coats of varnish, rubbing down lightly between coats along the grain.

770 EXTERNAL DOORS: Prime and coat bottom edges before hanging.

780 BEAD GLAZING: Joinery which is to be stained must have the first two coats of the staining system applied to rebates and beads before glazing.

781 BEAD GLAZING: Joinery which is to be varnished must have the first two coats of varnish applied to rebates and beads before glazing.

782 BEAD GLAZING: Joinery which is to be painted must have the primer and one undercoat applied to rebates and beads before glazing.

790 PUTTY GLAZING: Allow putty to set for 7 days then, within a further 14 days, seal with an oil based primer. Ensure that putty is fully protected by coating system as soon as it is sufficiently hard. Extend finishing coats on to glass up to sight line.

800 GLAZING: Protect etched, sand blasted and ground glass from contamination by oily constituents of coating materials by:
- Treating or masking edges before coating.
- Cleaning surfaces after coating.

810 WATER REPELLENT: Commence at top of wall, applying liberally to flood surface, ensuring complete coverage.

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

M61 FIRE PROTECTION OF STEELWORK

Provide 1 HOUR fire rating assembly to all structural steel members. Submit all details of fire rating to the CA for approval.

N10 GENERAL FIXTURES/FURNISHINGS/EQUIPMENT

To be read with Preliminaries/General conditions and to comply with the following codes and standards where applicable.

I.S. EN 14749 Domestic And Kitchen Storage Units And Worktops – Safety Requirements And Test Methods.
IS EN 12520 Furniture - STRENGTH, DURABILITY AND SAFETY - REQUIREMENTS FOR DOMESTIC SEATING

Other codes or standards referenced herein
Irish Building Regulations

150 FITTED KITCHEN UNITS:
- Drawing reference(s): CT 123, CT 124, CT 139,
- **To BS 6222 and I.S. EN 14749.**
- Manufacturer and reference: To Architects Approval.
  Structural performance to BS 6222:Part 2.
  Surface finishes performance to BS 6222:Part 3.
  Doors/drawer finish/colour: To Architects Approval.
  Side panel/plinth/shelves finish/colour: To Architects Approval.
  Worktop classification to BS 6222:Part 3, Type _____
  Worktop finish/pattern/colour: To Architects Approval.
  Accessories: As Indicated.
- Sinktop: As Indicated.
  Taps: As Indicated.
  Waste and trap: As Indicated.

160 SHELVING SYSTEM FOR VARIOUS ROOMS.
- Drawing reference(s): CT 134, CT 135, 136, 137, 142, 171 – 176.
- Manufacturer and reference: To Architects Approval.
  Components: As Indicated.

175 BENCHES FOR BEDROOM WINDOWS.
- Drawing reference(s): CT 105, 121, 171, 175.
- Manufacturer and reference: To Architects Approval.
  Test level to **IS EN 15520.**

Colour: As Indicated.
Fittings: As Indicated.

190 LOCKERS FOR BEDROOMS
- Drawing reference(s): CT 105, 121, 171, 175.
- To BS 4680.
- Manufacturer and reference: To Architects Approval.
  Test level to BS 4680.
  Colour(s): As Indicated.
  Fittings: As Indicated.

230 CURTAIN TRACK:
Manufacturer and reference: To Architects Approval.
Accessories: As Indicated.

290 MATWELL FRAME(S):
- Drawing reference(s): CT 162
- Material: Stainless Sreel angles, mitred at corners and welded.
  Angle size: To Architects Approval.
- Matwell size: 1800 x 1300mm

300 ENTRANCE MATTING:
Manufacturer and reference: To Architects Approval.
Colour: To Architects Approval.
Size: 1800 x 1300mm

320 PORTABLE FIRE EXTINGUISHERS:
- To BS EN 3, and BS 7863, complete with mounting brackets, and the requirements of all documentation in relation to the Grant of Fire Certificate.

INSTALLATION

710 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 moisture meter to manufacturer's recommendations.

720 INSTALLATION GENERALLY: Methods of fixing and fastenings to be as section Z20 unless specified otherwise.

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

750 WASTES/OVERFLOWS: Bed in waterproof jointing compound and fix with resilient washer between appliance and backnut.

760 SEALANT POINTING:
- Sealant: Silicone based to BS 5889, Type B with fungicide.
  Colour: Neutral
  Manufacturer and reference: To Architects Approval.
- Application: As section Z22.

770 TRIMS: Wherever possible to be in unjointed lengths between angles or ends of runs. Where running joints are unavoidable obtain approval of location and method of jointing. Mitre angle joints unless otherwise specified.

780 COMPLETION:
- Ensure that doors and drawers are accurately aligned and do not bind. Adjust as necessary to ensure smooth operation.
- Check, adjust and lubricate ironmongery as necessary to ensure correct functioning.

N13 SANITARY APPLIANCES/FITTINGS

To be read with Preliminaries/General conditions and Site Specific Sanitary Specification appended to this specification.

TYPE(S) OF APPLIANCE/FITTING

110 WC PAN AND CISTERN:
- Arrangement: Contour 21 Close coupled raised height
- Pan: Contour 21 Close Coupled
  Seat: Contour 21 seat, no cover As Indicated
  Pan connector: Contour 21 Close Coupled
- Cistern/Flush pipe: Contour 21 Close Coupled 4.5l As Indicated.
  Valve/Float/Operating mechanism: Microvalve HP/LP ballvalve As Indicated.
- Other accessories: As Indicated.
- Sealing: As Indicated.

160 Cleaners SINK: Type 1
- Type: Alder sink & Bucket grating.
- Taps: Alterna ½ " Quarter turn Bib Taps Lever handles wall mounted.
- Waste: 1 ½ " unslotted strainer waste
- Trap: 1 ½ " Bottle Trap
- Other accessories: As Indicated.
- Sealing: As Indicated.

161 Kitchen SINK: Type 2
- Type: Stewart inset s/s single bowl L/H drainer
- Taps: Markwik ½ " highneck pillar taps
- Waste: 1 ½ " unslotted waste
- Trap: 1 ½ " Resealing Bottle Trap
- Other accessories: As Indicated.
- Sealing: As Indicated.

180 WASH BASIN: Type 1
- Type: Portman 21
- Taps: Contour 21 single lever As Indicated.
- Waste: 1 ¼ " unslotted waste & swivel plug.
- Trap: 1 ¼ " metal bottle trap.
- Other accessories: As Indicated.

- Sealing: As Indicated.

181 WASH BASIN: Type 2
- Type: Contour 21 370 x 400mm
- Taps: Contour 21 single lever As Indicated.
- Waste: 1 ¼ " unslotted waste
- Trap: 1 ¼ " metal bottle trap.
- Other accessories: As Indicated.
- Sealing: As Indicated.

182 WASH BASIN: Type 3
- Type: Salonex 21
- Taps: Contour 21 single lever As Indicated.
- Waste: 1 ¼ " brass strainer waste with lift out grid
- Trap: 1 ¼ " metal bottle trap.
- Other accessories: As Indicated.
- Sealing: As Indicated

183 WASH BASIN: Type 4
- Type: Playa 55 inset basin.
- Taps: Ceraplan single lever As Indicated.
- Waste: 1 ¼ " pop up waste
- Trap: 1 ¼ " bottle trap.
- Other accessories: As Indicated.
- Sealing: As Indicated

230 SHOWER UNIT:
- Tray: N/A
- Shower fitting(s): Hansgrohe Aktiva/Ecostat As Indicated.
- Waste: Kent KHV225\40
- Enclosure: Shower curtain As Indicated.
- Other accessories: As Indicated.
- Sealing: As Indicated.

310 SOAP DISPENSER:
Manufacturer and reference: **Client supply**
Material/finish: _____

320 PAPER TOWEL DISPENSER:
Manufacturer and reference: **Client supply**
Material/finish: _____

330 TOWEL RAIL:
Manufacturer and reference: Hewi
Material/finish: As Indicated.

340 TOILET PAPER HOLDER:
Manufacturer and reference: Armitage Shanks
Material/finish: As Indicated.

350 HANDRAILS/GRAB BARS:
Manufacturer and reference: Hewi

Material/finish: Chrome plated As Indicated.

WORKMANSHIP

610 INSTALLATION GENERALLY:
- Assemble and fix appliances and accessories so that surfaces designed to falls drain as intended.
- Use nonferrous or stainless steel fastenings unless specified otherwise.
- Wherever possible, fix supply and discharge pipework before appliances. Ensure that appliances are fixed securely to structure and are not supported by pipework.
- 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. Do not stand on appliances.
- On completion, check for damage and defects and test for satisfactory operation. Replace damaged or defective components and accessories. Check for, and rectify leaks. Remove labels/stickers and clean appliances thoroughly.

613 COMPATIBILITY OF COMPONENTS:
Unless specified otherwise, every sanitary assembly must consist of functionally compatible components obtained from a single manufacturer.

617 WATER BYELAWS SCHEME APPROVAL: All sanitary appliances, taps and water fittings must be approved by the Water Byelaws Scheme administered by WRc plc, or otherwise be tested and approved to the satisfaction of the water undertaker to whose supply they will be connected.

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

625 FRAMING for preplumbed panel system to be as recommended by system manufacturer, accurately positioned and securely fixed.

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

650 WC PANS:
- Screw fix floor mounted pans and fit cover caps over screw heads. Unless specified otherwise, do not use mortar or other beddings.
- Ensure that seat and lid are stable when raised.

660 SLAB URINALS:
- Ensure that walls and floor slab are fully waterproofed, as specified elsewhere, before fixing urinal components.
- Assemble channels and slabs dry in correct sequence and check fit. Report any discrepancies to CA.
- Fix components with a 3 mm gap between.
- Completely fill space behind channels and slabs with 1:5 cement:sand grout.
- Rake out all joints to a depth of 10 mm and point flush with waterproof jointing compound recommended by urinal manufacturer.

670 CISTERNS:

- Unless specified otherwise obtain cistern operating components from cistern manufacturer. Ensure that ballvalve 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.

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

720 WASTES/OVERFLOWS: Bed in waterproof jointing compound and fix with resilient washer between appliance and backnut.

750 SEALANT POINTING:
- Sealant: silicone based to BS 5889, Type B with fungicide.
  Manufacturer and reference: To Architects Approval.
  Colour: Neutral.
- Application: As section Z22.

N15 SIGNS/NOTICES

To be read with Preliminaries/General conditions and to comply with the following codes and standards where applicable.

BS ISO 3864-1 Graphical Symbols - Safety Colours And Safety Signs - Part 1: Design Principles For Safety Signs And Safety Markings

Other codes or standards referenced herein &
Irish Building Regulations

GENERALLY

110 GENERAL REQUIREMENTS: Detailed requirements and locations of signs are indicated on the Drawings.

120 SIGNS RANGE:
- Unless specified otherwise, select signs from one manufacturer's range as far as possible. Where particular signs are unavailable, alternatives compatible in design, style, material, colour and finish may be submitted for approval.
- Inform CA of selected range, manufacturer and/or supplier.

130 SAMPLES: Submit examples of the following for approval. Keep approved samples on site for the duration of the contract.

131 SAMPLES: Provide a sample board for approval, containing selected signs and showing methods of fixing. Keep on site in an approved location for the duration of the contract.

TYPES OF SIGNS –
Refer to Electrical Specification, Fire Certificate Documentation & Disabled Access Certificate Documentation

210 FIRE SAFETY SIGNS:
- To **BS 5499:Part 1 and Health Technical Memorandum 65, Sign guides 1 and 2.**

220 PHOTOLUMINESCENT FIRE SAFETY SIGNS:
- To **BS 5499:Part 1 and Photoluminescent Safety Products Association (PSPA), Standard 002 part 1.**

225 PHOTOLUMINESCENT FIRE SAFETY SIGNS:
- **To Health Technical Memorandum 65, Sign guides 1 and 2 and Photoluminescent Safety Products Association (PSPA), Standard 002 part 1.**
- **Photoluminescent Safety Products Association (PSPA)**

235 SELF-LUMINOUS FIRE SAFETY SIGNS:
- To **BS 5499:Part 2 and Health Technical Memorandum 65, Sign guides 1 and 2.**

245 INTERNALLY ILLUMINATED FIRE SAFETY SIGNS:
- To **BS 5499:Part 3 and Health Technical Memorandum 65, Sign guides 1 and 2.**

250 HEALTH AND SAFETY SIGNS:
- To **BS 5378.**

255 HEALTH AND SAFETY SIGNS:
- Layout and graphics to **Health Technical Memorandum 65, Sign guides 1and 2.**
  Colorimetric and photometric properties to **BS 5378:Part 2.**

260 PUBLIC INFORMATION SIGNS:
- Layout and graphics to **BS 6034.**
  Colorimetric and photometric properties to **BS 5378:Part 2.**

265 PUBLIC INFORMATION SIGNS:
- Layout and graphics to **Health Technical Memorandum 65, Sign guides 1and 2.**
  Colorimetric and photometric properties to **BS 5378:Part 2.**

270 TACTILE SIGNS FOR THE VISUALLY HANDICAPPED:
Rectangular rigid signs to have radiused corners.
- Surface: Nonreflective with a maximum gloss factor of 15% when tested to BS 2782:Part 5 or BS 3900:Part D5.
- Characters: Embossed between 1 and 1.5 mm with a stroke width that allows both sides of the character to be felt with the fingers at a single pass.
  Braille: English Standard located 6 mm below the bottom of the text.

280 ROAD SIGNS:
- To BS 873:Parts 1, 2, 5 and 6 and the Highways Agency Traffic signs manual.
- Ferrous components must be drilled before the application of any finish.
  Any holes drilled in plates of plastics sheeting to have a clear lacquer, recommended by the plastics sheet manufacturer, applied to their edge to prevent the ingress of moisture damaging the lamination.

- Erect traffic signs in accordance with the Highways Agency Traffic signs manual, Chapter 1.
- Method of fixing: Austenitic stainless steel fasteners recommended for the purpose by the sign manufacturer.

310 OTHER SIGN(S):
- To BS 559.

FIXING SIGNS

410 FIXING GENERALLY:
- Fix signs securely, plumb and level, using fixing methods recommended by manufacturer, unless specified otherwise.
- Use fasteners/adhesives in accordance with section Z20, unless specified otherwise.
- Use fasteners of sufficient strength to support all live and dead loads.
- For external signs use fasteners manufactured from corrosion resistant material or with a corrosion resistant finish. Isolate dissimilar metals to avoid electrolytic corrosion.
- Fixings showing on the surface of the sign must not detract from the message being displayed.

420 SIGNS FOR THE VISUALLY HANDICAPPED: Ensure that fasteners for tactile signs have no sharp edges or protrusions that would cause confusion or injury to users.

440 POSTS FOR PERMANENT ROAD SIGNS:
- To BS 873:Part 7.

450 FIX SIGNS TO POSTS so that:
- Post top does not protrude above sign, unless supporting a luminaire.
- A single post is positioned in the centre of the sign.
- For signs supported on two posts, the distance from the centre of each post to the edge of the sign is 300 mm.

460 CONCRETE FOUNDATIONS FOR SIGN POSTS:
- Mix: To BS 5328:Part 2, Designated mix not less than GEN 1 or Standard mix not less than ST2 (alternative mix for small quantities: 50 kg Portland cement, class 42.5, to 100 kg fine aggregate to 180 kg 20 mm nominal maximum size coarse aggregate, medium workability). Do not use admixtures.
- Install posts plumb and centrally in holes blinded with a 50 mm layer of concrete. Fill holes with concrete to not less than 150 mm below ground level, ensuring full compaction as filling proceeds.
- Support posts for a minimum of three days after placing concrete. Do not backfill until at least 48 hours after placing.

470 SIGN POSTS CONCRETED TO STRUCTURES:
- Immediately prior to erection clean out all pockets in structure or foundation.
- Install posts plumb and centrally in pockets blinded with a 50 mm layer of concrete. Fill holes with concrete standard mix ST5 to BS 5328:Part 2 to finished foundation level, ensuring full compaction as filling proceeds.
- Support posts for a minimum of three days after placing concrete. Do not backfill until at least 48 hours after placing.

480 EXPOSED CONCRETE FOUNDATIONS not subsequently covered by paving to be compacted until air bubbles cease to appear on the upper surface, then weathered to shed water and trowelled smooth.

P10 SUNDRY INSULATION/PROOFING WORK/FIRE STOPS

To be read with Preliminaries/General conditions.

110 EAVES ROOF VENTILATORS FOR EXISTING ROOFS:
- Manufacturer and reference: As Indicated.
- Fix at eaves between all rafters to ensure free air space not less than required by Building Regulations for ventilation of roof space.

140 INSULATION FITTED BETWEEN RAFTERS:
- Manufacturer and reference:Moy Ltd. Isover
  Thickness: 150mm.
- Fit tightly with closely butted joints, leaving no gaps. Use fasteners where necessary to retain insulation and/or prevent slumping.
- Ensure that air space required above insulation is not restricted and eaves ventilation is unobstructed.

170 LOFT ACCESS HATCH(ES):
- Insulate with mineral wool mat, the same thickness as the loft insulation, neatly cut to fit with no gaps and securely fixed.
- Seal edges of hatch with an approved compressible draught excluder.

210 INSULATION FITTED BETWEEN STUDS:
- Material: Isover Apr 1200
  Thickness: 25 mm.
- Fit tightly with closely butted joints, leaving no gaps. Use fasteners where necessary to prevent slumping/ displacement.

310 VAPOUR CONTROL MEMBRANE FIXED TO STUDS/JOISTS/ FRAMING:
- Material: As Indicated.
  Manufacturer and reference: As Indicated.
- Before fixing vapour control membrane ensure that moisture content of timber is below 20%.
- Fix carefully and neatly to provide a fully sealed barrier free from tears, punctures and sagging.
- Fix with staples at not more than 250 mm centres along all supports. Lap membrane only at supports and not less than 100 mm. Lap over and fix to reveals of openings.
- Seal all joints and edges with adhesive tape as recommended by membrane manufacturer, including around pipes, ducts, etc.
- Immediately before covering over, check membrane for perforations and seal with tape.

P20 UNFRAMED ISOLATED TRIMS/SKIRTINGS/SUNDRY ITEMS

To be read with Preliminaries/General conditions.

110 Skirtings
- Quality of timber and fixing: To BS 1186:Part 3.
  Species: To Architects Approval.
  Class: J2
  Moisture content at time of fixing: 14% +/- 2 %
- Profile: As Indicated.
  Finished size: As Indicated.
  - Fixing: As Indicated.

111 Architraves
- Quality of timber and fixing: To BS 1186:Part 3.
  Species: To Architects Approval.
  Class: J2
  Moisture content at time of fixing: 14% +/- 2 %
- Profile: As Indicated.
  Finished size: As Indicated.
- Fixing: As Indicated.

160 SILICONE SEALANT:
- Sealant: Silicone based to B.S.5889, Type B with fungicide.
- Application: As section Z22.

240 PLYWOOD TO BS 6566
- Thickness: As Indicated.
- Appearance class to BS EN 635: Finish : Sanded.
- Bond quality to BS EN 314:Part 2:

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 and Site Specific Window Specification appended to this specification and Door & Window Schedules and to comply with the following codes and standards where applicable.

IS EN 1906 Building Hardware - Lever Handles And Knob Furniture - Requirements And Test Methods

I.S. EN 1935 Building Hardware - Single-Axis Hinges - Requirements And Test Methods
IS EN 1154 Building Hardware - Controlled Door Closing Devices - Requirements and Test Methods
I.S. EN 1155 Building Hardware - Electrically Powered Hold-Open Devices For Swing Doors - Requirements And Test Methods
IS EN 12209 Building Hardware - Locks and Latches - Mechanically Operated Locks, Latches And Locking Plates - Requirements and Test Methods

Other codes or standards referenced herein &
Irish Building Regulations

GENERALLY

110 GENERAL REQUIREMENTS:
Detailed requirements and locations of ironmongery are Indicated on drawings CT 105, 125, 126, 129 & 130.
Fixing is specified in section L10 & L20.

- Ironmongery shall be of approved manufacture and pattern.
  Prices shall include for all screws and fixing.
- Ironmongery generally shall comply with B.S. 3827.
- The contractor shall be responsible for ordering the correct hand of locks and ironmongery. All furniture is to be properly matched with paired keys and all keys are to be correctly labelled and handed over on completion.
- Mortice locks shall have steel enamelled case, brass bolts, reversible spring bolt, fore-end steel nickel plated, three brass levers – to have standard one hundred differs and to comply with performance test of B.S.5872:1980.

120 IRONMONGERY RANGES:
- Unless specified otherwise, select ironmongery from one coordinated range so far as possible. Where particular items are unavailable within the range, alternatives compatible in performance, design, style, material, colour and finish may be submitted for approval.
- Inform CA of selected range, manufacturer and/or supplier.
- Principal material/finish: Stainless Steel / Brushed.

130 APPROVED SUPPLIERS: Unless specified otherwise, obtain ironmongery from one of the following. Inform CA of selected supplier:

140 SAMPLES: Submit examples of the following for approval. Keep approved samples on site for the duration of the contract:
Door Lever/Pull Handles, Door closers. Hinges, Escutcheon and covers. Lock cases.

141 SAMPLES: Provide a sample board for approval, containing selected items of ironmongery and showing methods of fixing. Keep on site in an approved location for the duration of the contract.

150 IRONMONGERY FOR DOORSETS: Provide ironmongery required for each doorset in two separate packs (projecting and nonprojecting items) clearly labelled to identify the doorset to which it belongs. Deliver the packs of nonprojecting items to the doorset manufacturer for factory fitting and deliver the other packs to site.

160 IRONMONGERY FOR DOORS: Provide ironmongery for each door in separate, clearly labelled packs.

170 IRONMONGERY FOR FIRE DOORS: Unless specified otherwise, select ironmongery to comply with the recommendations of the Association of Builders' Hardware Manufacturers Code of practice 'Hardware essential to the optimum performance of fire resisting doorsets'.

180 DURABILITY: Unless specified otherwise, select ironmongery components to suit the following level(s) of use (as defined in **IS EN 1935**): Grade 3 (Heavy Duty)

200 DOOR PARAMETERS: When selecting ironmongery, the following values may be assumed for tendering purposes. Check suitability of ironmongery when actual values are known and before fixing.

- One hour fire resisting doors
  Size: 2040 x 900
  Thickness 54mm
  Construction: Solid Core Veneer faced and lipped
- Half hour fire resisting doors
  Size: 2040 x 900
  Thickness 44mm
  Construction: Solid Core Veneer faced and lipped
- Non fire resisting doors
  Size: 2040 x 900
  Thickness 44 mm
  Construction: Solid Core Veneer faced and lipped

HANGING DEVICES

310 HINGES:

- To IS EN1935 and marked accordingly. Unless specified otherwise, select strength class to suit door weight, duty, number of hinges and other factors as recommended in IS EN1935, Appendix C.
- Corrosion protection: Unless specified otherwise:
  CP 24 for internal use
  CP 48 for damp internal and unpolluted external use

CP 96 for polluted atmospheres.

330 NUMBER OF HINGES: Provide three butt hinges to each leaf unless specified otherwise.

OPERATING DEVICES

410 OVERHEAD CLOSERS GENERALLY:
- To IS EN 1154:Part 1, Class 7
- Manufacturer and reference: Dormer or similar approved.
  Type: TS 83
  Finish: Natural adonised Aluminium
- Closers must:
  - Be matched to the sizes and weights of doors
  - Override latches and/or door seals when fitted
  - Hold unlatched doors shut under normal working conditions.

420 OVERHEAD CLOSERS FOR FIRE DOORS: In addition to the general requirements for closers, overhead closers for fire resisting doors must:
- Be types included in successful tests to BS 476:Part 22 of door assemblies similar to those for which the closers are proposed. Submit evidence of testing by an approved laboratory.
- Be fixed on the opening face of the door unless specified otherwise.
- Have no mechanical hold open facility.
- Close positively against smoke seals where fitted.
- Have arms of iron, steel or other metal with melting point not less than 800 degC.

430 SWING FREE OVERHEAD CLOSERS must close the door when activated by the alarm system and/or failure of the power supply. A test switch must be located in a convenient position adjacent to the door.

440 SURFACE MOUNTED CLOSERS to be mounted on opening face of door except where they will be obstructed or where specified otherwise.

470 ELECTROMAGNETIC HOLD OPEN/ SWING-FREE DEVICES
Standard: To **BS EN 1155.**
Electromagnetic devices to fire/ smoke control doors: CE marked.
- Type:Floor & Wall Mounted To Architects Approval.
- Manufacturer and reference: To Architects Approval.
- The device must be activated by the alarm system and/or failure of the power supply to release the door and allow it to close.
- A test switch must be located in a convenient position adjacent to the door.

480 DOOR SELECTORS must be fitted to all single swing double doors with rebated meeting stiles fitted with self closers. Provide types that:
- Require the minimum amount of material to be removed from the door and frame
- Are suitable for the size of rebates
- Are from the same range as the closers and are of matching finish and colour.

SECURING

510 LOCKS
- To BS 3621 and Kitemarked.
- Method of operation: Master keyed

530 LOCKS
Manufacturer and reference: To Architects Approval.

540 LATCHES:
- To IS EN12209.
- Latch springs must be strong enough to prevent unsprung lever handles drooping.

550 LOCKS/LATCHES FOR FIRE RESISTING DOORS:
- Must not compromise the fire performance of the door and must be approved for the purpose by the door leaf manufacturer.
- Components critical to the retention of the door in a closed position must not have a melting point lower than 800 degC.

560 ESCAPE LOCKS: Locks specified for security purposes on escape routes must be fitted with a means of withdrawing the bolt without use of a key.

570 EMERGENCY EXIT DEVICES:
- Unless specified otherwise, to be panic bolts/latches to BS 5725:Part 1.
- Additional requirements: As Indicated.

571 EMERGENCY EXIT DEVICES:
Manufacturer and reference: To Architects Approval.

575 EMERGENCY EXIT DEVICES FOR FIRE DOORS:
Type included in successful tests to BS 476:Part 22 of door assemblies similar to those for which the closers are proposed. Submit evidence of testing by an approved laboratory.

585 BOLTS GENERALLY: Unless specified otherwise, provide bolts:
- To match door furniture and sized to suit height, weight and function of door.
- To secure the first closing leaf on double doors.

595 PRIVACY BOLTS must incorporate an external emergency release facility.

FURNITURE

610 LEVER HANDLES:
- To IS EN 1906.
- Mounting:As Indicated.

620 DOOR KNOBS:
- To IS EN 1906.
- Mounting: As Indicated.

631 KNOBSETS: To the performance requirements of IS EN 1906 and BS 5872.

640 PULL HANDLES: To Method of Building Performance Specification MOB H3 PS, July 1989, 'Hardware for internal doorsets'.

641 PULL HANDLES:
- Shape: D Handle
- Diameter: 38 mm
- Distance between centres: 1800 mm
- Mounting: Bolted

650 PULL HANDLES, where required, to be fixed on the pull side only with a push plate on the opposite side.

670 PUSH PLATES:
- Size: 100 x 1800 with rounded edges and radiused corners.
- Material/Finish: Stainless Steel / Brushed

690 KICK PLATES FOR:
- Size: To suit Door Leaf with rounded edges and radiused corners.
- Material/Finish: Stainless Steel / Brushed

710 ESCUTCHEONS: Provide separate escutcheons to keyholes where not part of a back plate.

711 ESCUTCHEONS: Provide pull type escutcheons to cylinder locks where no other pull handle is specified to be fitted.

720 STOPS: Unless specified otherwise, are required for doors opening against walls other than those fitted with closers with a back check facility.
Type: To Architects Approval.
Fixing height: To Architects Approval.

811 COAT HOOKS:
- Manufacturer and reference: Hewi
- Type(s): Single Coat Hook
- Material/Finish: Stainless Steel / Satin

850 THRESHOLD WEATHERSTRIP:
Manufacturer and reference: As Recommended & supplied by External Door Manufacturer.

855 WEATHERSTRIP to head and jambs:
Manufacturer and reference: As Recommended & supplied by External Door Manufacturer.

860 DOOR SEALS FOR FIRE PROOFING:
Manufacturer and reference: As Recommended & supplied by External Door Manufacturer.

910 AIR TRANSFER GRILLES:
- Manufacturer and reference: To Architects Approval.
- Material/Finish: Stainless Steel / Brushed

915 FIRE RESISTING AIR TRANSFER GRILLES:
- Type(s) included in successful tests to BS 476:Part 22 of door assemblies similar to those for which the grilles are proposed. Submit evidence of testing by an approved laboratory.
- Fire resistance: 30 min.
- Manufacturer and reference: To Architects Approval.
  Material/Finish: Stainless Steel / Brushed

P31 HOLES/CHASES/COVERS/SUPPORTS FOR SERVICES

To be read with Preliminaries/General conditions.

110 CO-ORDINATION: Liaise with subcontractors to establish locations and dimensions of all holes and chases required for services. Submit details to CA for checking before proceeding with the work.

150 HOLES AND CHASES IN IN SITU CONCRETE to be cast in. Do not cut hardened concrete or drill holes larger than 10 mm diameter without permission.

160 HOLES AND CHASES IN PRECAST CONCRETE: Do not cut or drill precast concrete without permission.

170 HOLES IN STRUCTURAL STEELWORK: Do not cut or drill structural steelwork without permission.

185 HOLES, RECESSES AND CHASES IN MASONRY:
- Holes, recesses and chases to be in locations which will least affect the strength, stability and sound resistance of the construction, and to be of the smallest practicable size.
- Holes must not exceed 300 mm square.
- Do not cut chases in walls of hollow or cellular blocks without approval.
- In walls of other materials:
  - Vertical chases must be not deeper than one third of the single leaf thickness.
  - Horizontal or raking chases must be not longer than 1 m and not deeper than one sixth of the single leaf thickness.
- Do not set chases or recesses back to back; offset by a clear distance not less than the wall thickness. Where sockets, etc. are shown on drawings as nominally back to back, obtain instructions.
- Do not cut until mortar is fully set. Cut carefully and neatly, avoiding spalling, cracking or other damage to surrounding structure. Do not cut chases with mechanical or hand impact tools.

220 PREFORMED HOLES IN MASONRY: Submit proposals for bridging over holes for ducts, pipes, etc., which exceed 150mm in width.

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 100 mm 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.

300 PIPE DUCTS **TO ENGINEER'S APPROVAL**
- Manufacturer and reference: _____
- Size(s): ___ mm

310 PIPE SLEEVES **TO ENGINEER'S APPROVAL**
- Material: _____
- Sleeves to extend through full thickness of wall/floor and be accurately positioned to give a minimum clearance around service of 20 mm or diameter of service, whichever is the least.
- Sleeves, whether built in or installed in preformed holes, to be bedded solid.
- Seal annular space between service and sleeve with _____
- Where exposed to view, finish bedding and sealing neatly to approval.

320 FIRE RESISTING PIPE SLEEVE(S) **TO ARCHITECT'S / ENGINEER'S APPROVAL**
Manufacturer and reference: _____
Type(s) and size(s) recommended for the purpose by manufacturer.
Fire resistance: ___ hour(s).

340 SEALING AROUND SERVICES: Seal around ALL SERVICES where they pass through FIRE RATED CONSTRUCTION. Completely fill the space, leaving no gaps and finish neatly.

350 FIRE RESISTING BARRIER(S) **TO ARCHITECT'S / ENGINEER'S APPROVAL**
Manufacturer and reference: _____
Type: _____
Fire resistance: ___ hour(s).

370 ACCESS COVER(S)/GRATING(S) **TO ARCHITECT'S / ENGINEER'S APPROVAL**
- Manufacturer and reference: _____
  Cover(s): _____
  Size: _____
- Frame/support/fixing: _____

R10 RAINWATER PIPEWORK/GUTTERS

To be read with Preliminaries/General conditions.

TYPE(S) OF PIPEWORK/GUTTER

160 GALVANIZED PRESSED STEEL PIPEWORK:
- Pipes, fittings and accessories:

Manufacturer and reference: To Architects Approval.
Size(s): As Indicated.
Finish/Colour: Polyester Powder Coated – As Indicated.
Accessories: As Indicated.
- Method of jointing: As manufacturers current written instructions.
- Method of fixing: As manufacturers current written instructions.

190 GALVANIZED MILD STEEL GUTTERS:
- Gutters and fittings:
- Manufacturer and reference: To Architects Approval.
Profile: Square
Gauge: To Architects Approval.
Size(s): As Indicated.
Finish/Colour: Polyester Powder Coated – As Indicated.
- Method of jointing: As manufacturers current written instructions.
- Method of fixing: As manufacturers current written instructions.

INSTALLATION

400 BEFORE COMMENCING WORK specified in this section, ensure that:
- Below ground drainage is ready to receive rainwater or that the discharge can be dispersed by approved means to prevent damage or disfigurement of the building fabric.
- Any specified painting of surfaces which will be concealed or inaccessible is completed.

410 INSTALLATION GENERALLY:
- Install pipework/gutters to ensure the complete discharge of rainwater from the building without leaking.
- Obtain all components for each type of pipework/guttering 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/gutters 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 nonferrous fastenings, suitable for the purpose and background, and compatible with the material being fixed.

415 BUILDERS WORK: Comply with restrictions on the cutting of holes, chases, notches, etc. and methods of attachment to the building fabric specified in section P31.

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

420 FIXING GUTTERS:

- Set out to a true line and even gradient to ensure no ponding or backfall. Position high points of gutters as close as practical to the roof and low points not more than 50 mm below the roof.
- Position outlets to align with connections to below ground drainage, unless shown otherwise on drawings.
- Provide for thermal and building movement when fixing and jointing, and ensure that clearances are not reduced as fixing proceeds.
- Seal as specified to make watertight.
- Ensure that roofing underlay is dressed into gutter.

430 GUTTER BRACKETS: Fix securely at specified centres and at all joints in gutters, with additional brackets near angles and outlets.

435 SEALANT JOINTS IN GUTTERS:
- Spread jointing compound evenly over jointing face of socket.
- For gutters with bolted joints, tighten joints in the gutter sole before any other bolts. Fit suitable washers, and spacers to prevent overtightening, unless specified otherwise.
- Tighten fixing to squeeze out some compound.
- Remove surplus, squeezed out compound and neatly clean off.

450 RAINWATER OUTLETS: Ensure that:
- Outlets are securely fixed before connecting pipework.
- Junctions between outlets and pipework can accommodate all movement in the structure and pipework.

460 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 and elsewhere use fixings that allow the pipe to slide.

465 JOINTING PIPEWORK/GUTTERS:
- Joint using materials, fittings and techniques which will make effective and durable connections.
- Joint differing pipework/gutter 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.

475 SYPHONIC DRAINAGE PIPEWORK:
- Fix pipework neatly, securely and adequately to prevent movement during extreme operating conditions including oscillating pressure and cavitation.
- Fix pipes with the minimum number of joints, bends and offsets.
- All pipework is to be fully accessible for repair or replacement unless specified or shown otherwise.
- Completed pipelines to be of smooth, consistent bore, clean and free from distortion, wrinkling, cracks and other defects.

485 COATED PIPEWORK/GUTTERS: Make good to coatings after cutting and any other damage or recoat, as recommended by the manufacturer.

490 PIPEWORK WITH UNSEALED JOINTS: Ensure that pipes are firmly secured to prevent rattling at joints and fixings.

510 ELECTRICAL CONTINUITY: Use clips or suitable standard couplings 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.

520 MASKING PLATES:
- Type: _____
  Material/Finish: _____
- Fixing: _____

530 IDENTIFICATION OF INTERNAL RAINWATER PIPEWORK: To BS 1710 using self-adhesive bands or identification clips located at junctions, at both sides of each slab, bulkhead and wall penetration, and elsewhere as directed.

540 ACCESS FOR TESTING AND MAINTENANCE:
- Install pipework and gutters with adequate clearance to permit testing, cleaning and maintenance.
- Position access fittings and rodding eyes so that they are not obstructed by other pipework, framing, etc.

550 TESTING GENERALLY:
- Inform CA sufficiently in advance to give him a reasonable opportunity to observe tests.
- Check that all sections of installation are free from obstruction and debris before testing.
- Provide clean water, assistance and apparatus for testing as required.
- Carry out tests as specified. After testing, locate and remedy all defects without delay and retest as instructed.
- Keep a record of all tests and provide a copy of each to the CA.

560 INTERNAL 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.
- Pump air into pipework until gauge registers 38 mm.
- Allow a period for temperature stabilization, after which the pressure of 38 mm is to be maintained without loss for not less than 5 minutes.

561 INTERNAL PIPEWORK TEST:
- Temporarily seal open ends of pipework with plugs.
- Connect a U tube water gauge and air pump via a plug.
- Pump air into pipework until gauge registers 50 mm.

- Allow a period for temperature stabilization, after which the pressure of 50 mm is to be maintained without loss for not less than 5 minutes.

570 GUTTER TEST: Block all outlets, fill gutters to overflow level and after 5 minutes closely inspect for leakage.

590 IMMEDIATELY BEFORE HANDOVER:
- Remove construction rubbish and debris from all roofs and gutters. Where possible, sweep and remove fine dust which may enter rainwater systems. Do not sweep or flush dust or debris into the rainwater system.
- Remove swarf, debris and temporary caps from the entire rainwater installation.
- Ensure that all access covers, rodding eyes, outlet gratings, etc. are secured complete with all fixings.

R11 FOUL DRAINAGE ABOVE GROUND

To be read with Preliminaries/General conditions.

TYPE(S) OF PIPEWORK

110 PVC-U PIPEWORK - **SUBMIT FOR APPROVAL OF CA / ENGINEER**
- Pipes, fittings and accessories: PVC-U to BS 4514, Kitemark certified.
  Manufacturer and reference: _____
  Nominal size(s): _____ mm.
  Colour: _____
  Accessories: _____
- Method of jointing: _____
- Method of fixing: _____

120 PLASTICS PIPEWORK - **SUBMIT FOR APPROVAL OF CA / ENGINEER**
- Pipes, fittings and accessories: _____ to BS 5255, Kitemark certified.
  Manufacturer and reference: _____
  Size(s): DN _____
  Colour: _____
- Accessories: _____
- Method of jointing: _____
- Method of fixing: _____

175 STAINLESS STEEL PIPEWORK - **SUBMIT FOR APPROVAL OF CA / ENGINEER**
- Pipes, fittings and accessories: Austenitic stainless steel grade AISI 304, push fit jointed with elastomeric joint rings to BS 2494.
  Manufacturer and reference: _____
  Size(s): _____ mm diameter.
  Accessories: _____
- Method of fixing: _____

250 FLOOR DRAINS see drawing CT 120, 138, & 143.
- Floor construction: As Indicated.
- Manufacturer and reference: As Indicated.
  Body type/material: As Indicated.
  Grating/Cover type/material: As Indicated.

Outlet: Type and direction to suit pipework with adaptors and connections recommended for the purpose by drain manufacturer.
Accessories: As Indicated.

270 RODDING EYES
Manufacturer and reference: To Architects Approval.
Body material: uPvc
Cover type/material: To Architects Approval.

INSTALLATION

510 PERFORMANCE CRITERIA: Install pipework, fittings and accessories to ensure that:
- Appliances drain quickly, quietly and completely at all times without nuisance or risk to health.
- Discharge is conveyed without crossflow, backfall, leakage or blockage.
- Air from the drainage system does not enter the building.
- Pressure fluctuations in pipework do not vary by more than +/- 38 mm water gauge and traps retain a water seal of not less than 25 mm.
- The system can be adequately tested, cleaned and maintained.

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 nonferrous 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.

600 COATED PIPES: Make good to coatings, after cutting and any other damage, or recoat as recommended by the pipe manufacturer.

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.

730 IDENTIFICATION OF INTERNAL FOUL DRAINAGE PIPEWORK: To BS 1710 using self-adhesive bands or identification clips located at junctions, at both sides of each slab, bulkhead and wall penetration, and elsewhere as directed.

740 AIR ADMITTANCE VALVES: Agrement 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.

800 ACCESS FOR TESTING AND MAINTENANCE:
- Install pipework with adequate clearance to permit testing, cleaning and maintenance.
- Position access fittings and rodding eyes so that they are not obstructed by other pipework, framing, etc.

810 TESTING GENERALLY:
- Inform CA sufficiently in advance to give him a reasonable opportunity to observe tests.
- Check that all sections of installation are securely fixed and free from obstruction and debris.
- Ensure that all traps are filled with clean water.
- Carry out tests as specified. After testing, locate and remedy all defects without delay and retest as instructed. Do not use smoke to trace leaks.
- Keep a record of all tests and provide a copy of each to CA.

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.

830 SIPHONAGE AND BACK PRESSURE TESTS:
- Test WC pans by flushing and test other appliances by filling to overflow level, then removing the plug.
- Carry out tests at least 3 times with traps recharged before each test.
- Test each appliance individually for self siphonage, then test for induced siphonage and back pressure by discharging the following numbers of appliances simultaneously on each stack:
  WCs: to be agreed with Engineer
  Washbasins: to be agreed with Engineer
  Sinks: to be agreed with Engineer
  Agree selection of appliances with CA.

850 IMMEDIATELY BEFORE HANDOVER: Ensure that temporary caps have been removed and that permanent blanking caps, access covers, rodding eyes, floor gratings and the like are secured complete with all fixings.

R12 DRAINAGE BELOW GROUND

To be read with Preliminaries/General conditions.

GENERALLY

All pipes, fittings and appurtenances used in the works shall be to relevant standards specified or described and shall be clearly marked with the standard mark where appropriate, manufacturer's name or mark, date of manufacture, nominal size and class of pipe. In addition to the pipe bedding, trench backfilling, compaction and reinstatement requirements set out in this section for pipes and pipelaying, the Contractor shall comply with any backfilling and reinstatement details or drawings supplied as part of the Contract.

Maintain Flow in Existing Sewers - Provision shall be made by the Contractor for the continuous discharge of all existing sewers or drains interfered with during the construction of the works.

100 EXISTING DRAINS:
- Before starting work, check invert levels and positions of existing drains, sewers, inspection chambers and manholes against information shown on drawings and report any discrepancies to CA.
- Adequately protect existing drains and maintain normal operation during construction.

106 IN SITU CONCRETE:
- Unless specified otherwise, in situ concrete for use in drainage below ground to be to BS 5328, mix PER SECTION E
  or an equivalent or better mix subject to approval.

- Different mixes may be used for different parts of the drainage work.

TYPE(S) OF PIPELINE

131 **CONCRETE PIPELINES** – AS INDICATED ON DRAWINGS

- Pipes, bends and junctions: Precast concrete to **BS 5911:Part 100**, with flexible joints, Kitemark certified. All pipes, fittings and appurtenances used in the works shall be to relevant standards specified or described and shall be clearly marked with the standard mark where appropriate, manufacturer's name or mark, date of manufacture, nominal size and class of pipe. In addition to the pipe bedding, trench backfilling, compaction and reinstatement requirements set out in this section for pipes and pipelaying, the Contractor shall comply with any backfilling and reinstatement details or drawings supplied as part of the Contract.

  Unreinforced and reinforced concrete pipes and fittings with flexible or rigid spigot and socket joints shall comply with **IS 6.** Concrete fittings shall be manufactured to the same standard as the pipes and they shall be of approved dimensions.
  All pipes and fittings shall have gasket-type flexible joints of spigot and socket or rebated form, unless otherwise described in the Contract. Rubber joint rings shall be type 2 and shall comply with **BS 2494** and shall be obtained from the pipe manufacturer.
  The concrete mix for pipe manufacturing shall contain not less than 360 Kg. of cement per cubic metre of fully compacted concrete and shall have a maximum water cement ratio of 0.45. The Contractor shall ensure that, in addition to complying with the crushing strength requirements detailed in the Contract, concrete pipes supplied for installation by pipe-jacking techniques can withstand the thrusting forces to which they will be subjected during installation, without cracking or spalling. A certificate confirming that the pipes are suitable for jacking and indicating allowable distributed jacking forces shall be supplied. The characteristic strength of concrete used in the manufacture of pipes for jacking shall be not less than 65 N/sq. mm.

132 **DUCTILE IRON PRESSURE PIPELINE**

- Pipes and bends: Ductile iron to BS EN 598, Kitemark certified.
  Ductile Pipes, fittings and joints shall comply with the relevant provisions **of IS EN 545, IS EN 598 and IS EN 969.** They are to have "Tyton" or similar approved compression ring flexible joints or flanged joints where indicated on Drawings. All pipes and fittings shall be cement lined internally and coated externally with an approved bituminous composition to **BS 3416 type 1** or **11 or 4147** type 1 Grade "D". The pipes shall also be sleeved with a factory applied polyethylene external sleeving system with a film thickness of not less than 200µm for corrosion protection.
  Where Iron pipes are to be used these shall in general be Ductile Iron Pipes and the Engineers approval will be required if Cast Iron or Spun Iron Pipes or Fittings are to be substituted. Split Puddle Flanges on Ductile Iron Pipes are to be used only in locations where they are not required to provide an anchorage for the pipe. The flanges are to be fitted to the pipe using a suitable non toxic metallic sheeting to provide a packing between flange and pipe body and caulked after fixing. Puddle flanges, which are required to provide anchorage for the pipe, are to be integrally cast on welded Puddle Flanges.

133 **UNPLASTICIZED PVC PIPES AND FITTINGS**

Unplasticized PVC pressure pipes shall comply with the relevant provisions of the Provisional Specification of the Department of the Environment PLG A/6.
Unplasticized P.V.C. pipe for watermains shall be certified by National Standards Association of Ireland under the Department of the Environment's Certification Scheme, as complying with the "Local Government" Provisional Specification reference P.L.G.A., and

shall bear the appropriate Mark of Conformity. Manufacturers or suppliers may be called upon by the Engineer to produce evidence from the N.S.A.I. that their products are so certified. Joints and fittings for pressure pipes in accordance with BS 3505 shall comply with the relevant provisions of BS 4346, Parts 1 and 2 for solvent welded and mechanical joints respectively.

134 **HIGH DENSITY POLYETHYLENE PIPES**

High Density Polyethylene Pipes shall comply with IS 135 for Polyethylene Pipe 50 Type.

135 **PLASTIC SLEEVING FOR BURIED PIPES**

Tubular polyethylene film for use as a protective sleeving for buried iron pipes and fittings shall comply with the relevant provisions of BS 6076, except that the nominal layflat width for use with 100mm and 150mm nominal internal diameter pipelines incorporating mechanical flexible joints shall be 280mm and 400mm respectively.

136 **PIPES FOR LAND DRAINAGE AND TEMPORARY DRAINS**

Pipes, joints and fittings for land drainage and temporary drains shall comply with the relevant provisions of the appropriate British Standard as set out below:

LAND AND TEMPORARY DRAINS;
"Perforated" or "Surface Water" vitrified clay pipes and fittings - BS 65
Concrete Porous Pipes for Under Drainage - BS 5911 Part 114
Plastics Pipes for use as Light Duty Sub-Soil Drains - BS 4962
"Land Drainage" category concrete pipes and fittings with ogee joints - BS5911 Part 10

137 PIPES FOR DUCTS: **IN ACCORDANCE WITH UTILITY PROVIDER'S REQUIREMENTS**

Pipes, joints and fittings for **exposed ducts** for building services shall comply with the relevant provisions of the appropriate British Standard as set out below:

Unplasticised PVC pipes for industrial purposes - BS 3506 Class "O"
Hollow steel sections (greater than 150mm OD) - BS 4848 Part 2
Steel tubes (not greater than 150mm OD) – BS 6323 Part 2 HFW2

Pipes, joints and fittings for **buried ducts** shall have flexible mechanical joints and comply with the relevant provisions of the appropriate British Standard as set out below:

Unplasticised PVC – BS 4660 or 5481

138 Rainwater pipes, gutters, fixings and accessories shall comply with the relevant provisions of the appropriate British Standard as set out below:
Cast Iron - BS 460, Type A
Aluminium – BS 2997
uPVC – BS 4576, Part 1

139 Soil, waste and ventilating pipes, fittings and accessories for above-ground drainage systems shall comply with the relevant provisions of the appropriate British Standard as set out below.
Cast Iron - BS 416 Type A
uPVC (Soil and Ventilating) – BS 4514
Polypropylene (waste) - BS 5254
Plastics (waste) – BS 5255
Wash basin and sink wastes shall comply with the relevant provisions of BS 3380.

Plastic waste traps shall comply with the relevant provisions of BS 3943.

140 TRANSPORT AND STORAGE

The handling, transportation and storage of pipes and fittings shall be done in accordance with the manufacturer's recommendations and in accordance with the following:-
Unplasticised PVC Pipes (Pressure) Recommendation SR3 published by IIRS
Unplasticised PVC Pipes (Gravity) Recommendation SR7 published by IIRS.
During loading, unloading, stacking and general handling of pipe on site care shall be taken to avoid damage to all materials and in particular the coating/wrapping of iron or steel pipes and fittings. During transportation pipes shall be adequately supported for their length on a flat surface. Pipes shall be lifted with approved slings to avoid damage. Pipe fittings and accessories shall be stored on a secure level site in a neat and orderly manner. Only those items required for immediate use shall be deposited along pipeline route.

145 SETTING OUT OF SEWERS & RISING MAINS

The Contractor shall be held responsible for the proper setting out of the pipelines, which shall be laid to their proper levels and grades with the aid of a pipe laying laser. If sight rails are permitted, the centre of pipelines shall be located, at points of change of gradient or direction, with strong durable and firmly fixed pegs, and strong rails not less than 150mm deep with top edges planed straight and true shall be fixed over the centre of each manhole or where a change of direction or gradient occurs, and at any other points which may be selected or decided upon by the Engineer or Resident Engineer for this purpose. Each sight rail shall be supported by a rigid wooden post at each end and its top edge shall be accurately fixed to a definite height in even metres above the level of the invert of the sewer to be constructed. As a safeguard against the accidental displacement of a sight rail there shall be at least three rails oneach length of sewer to be constructed at any one gradient and in any event the maximumdistance between adjoining sight rails shall not be greater than 50 linear metres. The centre line of the pipeline shall be denoted on each sight rail front and back with a single vertical line drawn thereon and for easy vision it is desirable that the rails be painted with contrasting colours.

Boning rods shall be accurately made to the various lengths required in even metres and the lower end of each rod shall have a shoe of sufficient projection to rest on the invert of the last pipe laid.

Sight rails shall be provided, fixed and maintained by the Contractor, who shall set out the positions and levels of the pipelines according to the Drawings or in accordance with any written instructions he may receive from the Engineer during the progress of the work. The Contractor shall be held entirely responsible for the correctness of the levels and positions of pipelines and structures so set out by him and he shall provide at his own cost all labour and materials necessary to enable the Engineer to check the levels and dimensions whenever he considers it necessary to do so.

The use of sight rails will only be allowed in certain circumstances and the Contractor shall in general use a pipelaying laser to establish the final surfaces of the trenches, the bedding levels and the pipe levels and shall include for this in his rate for pipelaying.

In the case of twin pipe trenches a separate laser instrument shall be used on each pipeline. Pipelaying lasers shall be self levelling with digital read out of grade and with an accuracy of not less than 0.01%.

Accessories shall include suitable base plates and targets for the smaller diameter pipes upto 400mm diameter. For the larger diameter pipes up to 1800mm diameter suitably

fabricated supports and centering devices shall be provided to allow for accurate setting of the instruments either on the invert of the pipeline or on the centreline.

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 300 mm 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 300 mm or larger dimension if specified.

212 EXCAVATION OF PIPE TRENCHES:
- Strip all the turf, soil or other surface materials and excavate all materials in the trenches to the exact lines and levels required. Should any excess in depth of trenches be excavated it shall be made up to the correct level with appropriate materials as directed by the Architect, at the contractors expense.
- If the specified maximum width is exceeded due to the contractors method of working, the contractor shall provide, at his own expense, such additional pipe protection which is required as directed by the Architect.
- Where rock is present in the pipe trench, trim the sides of the trench so that when pipes is laid to the correct level and alignment, no projection of rock comes within 100 mm of the outside of the pipe barrel at any point.
- Avoid unduly disturbing the finished trench formation and make good disturbed areas and excavate any wet or puddle material which may occur. Make good all voids with appropriate materials as directed by the Architect.
- Avoid material excavated in pipe trenches is unsuitable for filling, it shall be removed and replaced by suitable material. Set aside all suitable material for use as backfill.

219 BACKFILLING OF TRENCHES – NORMAL BACKFILL:
- Where practicable carry out backfilling immediately the specified operations proceeding it have been completed.
- No backfill material shall be placed in trenches containing water.
- In trenches in gardens, field or open country, backfill with selected excavated material. Selected excavated material shall be readily compactable material, free from tree roots, vegetable matter, building rubbish, frozen soil, clay lumps retained on a 75 mm sieve. Backfill may be placed by machine provided the method of operation ensures that the material slided or rolls into position and does not drop from a height. Compact backfill material in layers not exceeding 300 mm thick but do not use heavy compactors before there is 500 mm of material over the pipe.

220 BACKFILLING OF TRENCHES – IN CARRIAGEWAYS:
- Where practicable carry out backfilling immediately the specified operations proceeding it have been completed.
- No backfill material shall be placed in trenches containing water.
- In trenches in roads, footpaths and paved areas, verges and, where directed above 300 mm over the crown of the pipes, backfill with crushed rock to Q20/121. Deposit backfill materials in layers not exceeding 250 mm thickness and compact each layer. Use power rammers or vibrating plate compactor to compact the backfilling from 1 m above the crown level of the pipe to the surface.

220 LOWER PART OF TRENCH: Where the depth of cover exceeds the transition depth for the size of pipe, trench width up to 300 mm above crown of pipe to be not more than:

Nominal pipe size DN	100	150	225	300
Transition depth (m)	6.0	5.4	4.0	2.9
Maximum trench width (mm)	600	700	800	900

221 LOWER PART OF TRENCH: Where bedding class S is specified (see clause 370) trench width to be not more than the following, regardless of depth of cover:

Nominal pipe size (DN)	100	150	225	300
Maximum trench width (mm)	600	700	800	900

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.

250 COMBINED TRENCHES: Where one pipe is at a lower level than another adjacent pipe in a common trench:
- A subtrench is permissible provided the soil of the step is stable and unlikely to break away.
- If a subtrench is not permissible, the whole trench must have a depth related to the lower pipe, with increased thickness of bedding to the upper pipe as necessary.
- The lower pipe must be backfilled with compacted granular material to not less than half way up the higher pipe.

260 TRENCH SUPPORTS: Remove trench supports and other obstacles sufficiently to permit compacted filling of all spaces.

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 300 mm thick. Do not use heavy compactors before there is 600 mm 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 Subbase Material Type 1 to DOT Specification for Highway Works, Clause 803, laid and compacted in 150 mm layers.

281 BACKFILLING OVER CONCRETE: Do not start backfilling within 24 hours of placing concrete. Do not use heavy compactors and prevent imposition of traffic loads within 72 hours of placing concrete.

290 TEMPORARY BRIDGES: Provide temporary bridges over trenches as necessary to prevent construction traffic damaging pipes after backfilling.

295 WARNING MARKER TAPES:
- Lay during backfilling in a continuous line over pipelines, 300 to 400 mm below the level of the finished surface.
- For pipelines at a depth greater than 1.2m lay an additional marker 600 mm above the top of the pipeline.

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.

311 TESTING OF PIPE BEDDING AND SURROUND MATERIAL

For testing pipe bedding and surround material, a representative sample of about 40 Kg. shall be heaped onto a clean surface and quartered to obtain approximately 10 Kg. The moisture content of the sample should not differ materially from that of the main body of material, at the time of use in the trench.

A 150mm internal diameter open ended cylinder, 250mm high, shall be placed on a firm flat surface and loosely filled, without tamping, from the 10 Kg. sample. Any surplus material shall be struck off level with the top of the cylinder. The area around the filled cylinder shall be cleared of all surplus material and the cylinder then lifted clear of its contents and placed alongside the material.
Approximately one quarter of the material shall then be placed into the cylinder and compacted by tamping vigorously with a 40mm diameter metal rammer weighing about 1 Kg. until no further compaction can be obtained. This operation shall then be repeated for each of the remaining quarters, tamping the final surface as level as possible. The distance from the top of the cylinder to the surface of the final layer shall then be measured and this value, divided by the height of the cylinder, shall be taken as the Compaction Fraction.

320 CLASS A HALF DEPTH CONCRETE SUPPORT:

- Concrete mix AS PER SECTION E
- Lay concrete blinding, 25 mm thick, and allow to set.
- Lay pipes on two-layer pads of bituminous dpc or equivalent on precast concrete cradles to give a clearance of not less than 100 mm under pipes and a nominal clearance between couplings/sockets and blinding.
- Lay concrete bed, width not less than external diameter of pipe plus 200 mm. Shutter vertical sides of concrete or extend concrete across full width of trench.
- After initial testing, place and compact more concrete for full width of concrete bed or full width of trench to halfway up each side of pipe.

330 CLASS B HALF DEPTH GRANULAR SUPPORT:

- Granular material: To BS 882:

Pipe size (DN)	Nominal single size (mm)	Graded size (mm)
100 & 150	10	Not permitted
225 & 300	10 or 20	20 to 5

- Lay and compact to a thickness not less than 50 mm for sleeve jointed pipes, 100 mm for socket jointed pipes, over full width of trench. Where trench bottom is uneven due to hard spots or other reason, increase depth by 100 mm. 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, lay and compact more granular material uniformly to halfway up each side of pipe.
- Backfill to 150 mm (250 mm 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 40 mm sieve. Compact by hand in 100 mm layers.

340 CLASS D NATURAL BED:

- Excavate trench slightly shallower than the final levels.
- Hand trim to accurate gradients, replacing any overdig with compacted spoil. Where hand trimming is impracticable obtain instructions before proceeding.
- Cut holes in trench bottom for couplings/sockets and lay pipes resting uniformly on their barrels, adjusting to line and gradient. Do not use hard packings under pipes.
- After initial testing, backfill to 150 mm (250 mm 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 40 mm sieve. Compact by hand in 100 mm layers.

350 CLASS F GRANULAR BED:

- Granular material: To BS 882:

Pipe size (DN)	Nominal single size (mm)
100 & 150	10
225 & 300	10 or 20

- Lay and compact to a thickness not less than 50 mm for sleeve jointed pipes, 100 mm for socket jointed pipes, over full width of trench. Where trench bottom is uneven due to hard spots or other reason, increase depth by 100 mm. 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 150 mm (250 mm 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 40 mm sieve. Compact by hand in 100 mm layers.

360 CLASS N AS-DUG MATERIAL BED:

- Material: As-dug material with a compaction fraction of not more than 0.3, or all-in aggregate, nominal size 10 mm, or fine aggregate to BS 882.
- Lay and compact to a thickness not less than 50 mm for sleeve jointed pipes, 100 mm for socket jointed pipes, over full width of trench. Where trench bottom is uneven due to hard spots or other reason, increase depth by 100 mm. 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 150 mm (250 mm 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 40 mm sieve. Compact by hand in 100 mm layers.

370 CLASS S GRANULAR SURROUND:

- Lower part of trench width to be as clause 221.
- Granular material: To BS 882:

Pipe size (DN)	Nominal single size (mm)	Graded size (mm)
100 & 150	10	Not permitted
225 & 300	10 or 20	20 to 5

- Lay and compact to a thickness not less than 50 mm for sleeve jointed pipes, 100 mm for socket jointed pipes, over full width of trench. Where trench bottom is uneven due to hard spots or other reason, increase depth by 100 mm. 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, lay and compact more granular material in 100 mm layers to 150 mm (250 mm for adoptable sewers) above crown of pipe.

380 CLASS O FULL DEPTH GRANULAR SUPPORT:

- Granular material: To BS 882:

Pipe size (DN)	Nominal single size (mm)
100 & 150	10
225 & 300	10 or 20

- Lay and compact to a thickness not less than 100 mm over full width of trench. 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, lay and compact by hand more granular material to slightly above crown of pipe.
- Backfill with a protective cushion of selected fill, free from vegetable matter, rubbish, frozen soil and material retained on a 40 mm sieve. Compact by hand in 100 mm layers to 300 mm above crown of pipe. (100 mm of granular material may be used in lieu).

390 CLASS P FULL DEPTH GRANULAR SUPPORT:

- Granular material: To BS 882:

Pipe size (DN)	Nominal single size (mm)	Graded size (mm)
100 & 150	10	Not permitted
225 & 300	10 or 20	20 to 5

- Lay and compact to a thickness not less than 100 mm over full width of trench. 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, lay and compact by hand more granular material to slightly above crown of pipe.
- Backfill with a protective cushion of selected fill, free from vegetable matter, rubbish, frozen soil and material retained on a 40 mm sieve. Compact by hand in 100 mm layers to 300 mm above crown of pipe. (100 mm of granular material may be used in lieu).

400 CLASS Q GRANULAR SURROUND WITH PROTECTION:

- Granular material: As for Class P bedding, clause 390.
- Lay pipes as for Class P bedding.
- After initial testing, lay and compact by hand more granular material to 75 mm above crown of pipe. Rake out to form an even bed and lay precast concrete paving flags to BS 7263, 450 mm wide and butted together (if necessary increasing the width of the upper part of the trench). Backfill with soil or topsoil as appropriate.

410 CLASS T FULL DEPTH GRANULAR SUPPORT:

- Granular material: To BS 882:

Pipe size (DN)	Nominal single size (mm)	Graded size (mm)
100 & 150	10	Not permitted
225 & 300	10 or 20	20 to 5

- Lay and compact to a thickness not less than 100 mm over full width of trench. 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, lay and compact by hand more granular material to 100 mm above crown of pipe.

420 CLASS V FULL DEPTH GRANULAR SUPPORT:

- Granular material: To BS 882

Pipe size (DN)	Nominal single size (mm)	Graded size (mm)
100 & 150	10	Not permitted
225 & 300	10 or 20	20 to 5

- Width of trench to be not less than external diameter of pipe plus 600 mm. Lay and compact granular material not less than 200 mm thick over full width of trench.
- 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, lay and compact by hand more granular material to 150 mm above crown of pipe.

430 CLASS W GRANULAR SURROUND:

- Excavate trench after hardcore has been laid and compacted.
- Granular material: To BS 882:

Pipe size (DN)	Nominal single size (mm)
100 & 150	10
225 & 300	10 or 20

- Lay and compact to a thickness not less than 100 mm over full width of trench. 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, lay and compact by hand more granular material to 100 mm above crown of pipe.
- Backfill with hardcore or granular material compacted in layers not exceeding 300 mm thick up to slab formation.

441 CLASS X GRANULAR SURROUND FOR GROUND WATER:

- Lay 75 mm deep bed, at least 100 mm wider than pipe, with 10 mm single size material to BS 882.
- Lay pipes and adjust to line and gradient.
- Complete surround with single size material compacted to 150 mm above crown of pipe.

451 CLASS Y CONCRETE SURROUND FOR SHALLOW PIPES UNDER BUILDINGS:

- Where crown of pipe is less than 300 mm below underside of slab, encase pipe in concrete of same mix as slab and cast integrally with the slab. Extend length of concrete surround to within 150 mm of next nearest flexible joint.
- Excavate trench after hardcore has been laid and compacted.
- Lay concrete blinding, 25 mm thick over full width of trench and allow to set.
- Lay pipes on blinding on folding wedges of compressible board not less than 100 mm above blinding. Anchor the pipeline or fill with water, if necessary, to prevent flotation.

461 CLASS Z CONCRETE SURROUND:

- Concrete mix as specified under Generally.
- Lay concrete blinding, 25 mm thick over full width of trench and allow to set.
- Lay pipes on blinding on folding wedges of compressible board to give a minimum 150 mm clearance under the pipe. Anchor the pipeline or fill with water, if necessary, to prevent flotation.
- Form vertical construction joints in surround at face of flexible pipe joints using 18 mm thick compressible board precut to profile of pipe. Fill any gap between spigot and socket with resilient material to prevent entry of concrete.

- After initial testing, place and compact more concrete for full width of trench to encase pipe to 150 mm above crown or to other height as specified or shown on drawings.

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.

480 TRENCHES MORE THAN ONE METRE FROM FOUNDATIONS:
- Where bottom of drainage trench is below a critical level, (defined below) Class Z concrete surround as clause 461 is to be used, the top of the concrete being not lower than the critical level.
- For the purpose of this clause the critical level is D mm lower than level of foundation bottom, D mm being equal to the horizontal distance of the near side of the trench from the foundation, minus 150 mm.

490 CROSSOVERS: Where two pipelines (other than plastics pipes) cross with less than 300 mm separation, surround each with Class Z concrete surround as clause 461 for not less than 1 m centred on the crossing point. Extend length of concrete surrounds as necessary to within 150 mm of next nearest flexible joints.

512 PIPELINES PASSING THROUGH STRUCTURES:
- Where pipelines must be cast in or fixed to structures (including manholes, catchpits and inspection chambers) provide short length or rocker pipes near each external face, with flexible joint at each end:

Pipe size (DN)	Distance to first joint from structure (mm)	Short length (mm)
100 & 150	150	600
225	225	600

- Where pipelines need not be cast in or fixed to structures (e.g. walls to footings) provide either:
  - short length or rocker pipes as specified above, or
  - openings in the structures to give 50 mm minimum clearance around the pipeline and closely fit a rigid sheet to each side of opening to prevent ingress of fill or vermin.

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

521 BENDS AT BASE OF SOIL STACKS:
- Unless specified otherwise, form with two 45 degrees bends to the centreline of the 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 1.5 m.
- Horizontal distance from the drop to a ventilated drain must not exceed 6 m.

530 RIGID BACKDROP PIPES outside the manhole wall: Encase with not less than 150 mm of concrete as specified under Generally. All excavation beneath the backdrop pipe and its surround must be replaced with concrete.

550 ANCHORAGES TO PRESSURE PIPES:
- Concrete mix as specified ON DRAWINGS

- Horizontal thrusts: Cast cradle around half of pipe up to undisturbed trench side.
- Vertical or inclined thrusts: Clamp pipeline/fitting to concrete block below with two 6 mm galvanized steel straps.
- Pipeline inclines greater than 16.5%: Cast concrete blocks across pipe and set into undisturbed ground.

570 FLEXIBLE COUPLINGS:

- To BS EN 295-4, WIS 4-41-01, or Agrement certified.
  Manufacturer and reference(s): TO APPROVAL OF THE ENGINEER
- 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.

580 CONCRETE BED HAUNCH SURROUND AND ARCH

Where the cover over the pipe is less than 900mm in roads/paved areas or 700mm in fields a concrete arch to the dimensions shown on the drawings shall be placed over the pipeline. Where the cover over the pipe is less than 600mm in roads/paved areas or 500mm in fields the pipe shall be bedded and surrounded in concrete to the dimensions given on the 'Typical Details' drawings.

Concrete for bed, haunch, surround or arch to pipes shall be Grade 20 and no back filling of the trench shall be carried out until the concrete has reached a strength of 15 Newtons per square millimetre.

Compressible filler for interrupting concrete protection to pipelines shall consist of bitumen impregnated insulating board to BS 1142, Part 3 or other equally compressible material. The thickness of compressible filler shall be as below:

Nominal Bore of Pipe (mm)	Thickness of Compressible Filler (mm)
Less than 450	18
450 - 1200	36
Exceeding 1200	54

Compressible packing for use between pipes and precast concrete setting blocks shall consist of bitumen dampproof sheeting complying with BS 743, Type G.

For bed, haunch and surround, before placing, concrete pipes shall be supported near each joint on a precast concrete block or engineering brick with a padding of two layers of hessian based damp proof course or material of similar yield between the barrel of the pipe and the supporting block. The surface of the support shall be perfectly smooth for at least 75mm x 75mm under the pipe. Precast setting blocks for pipes shall have rectangular faces, with sufficient plan area to provide an adequate seating for the pipes. They shall be manufactured from Grade 20 concrete using the same type of cement as in the adjacent concrete bed, and be cast in an approved mould. Blocks shall not be used until they have achieved a cube strength of 13.5 N/Sq.mm.

Concreting of bedding, haunching, arch or surrounding shall not be carried out until the pipes have been jointed and inspected. The concrete shall be tamped or vibrated into place under the pipe and the concrete shall be in full contact with the underside of the barrel of the pipe throughout its length. The concrete shall be placed in one operation and shall be well worked to form a homogeneous mass. There shall be no horizontal construction joint in the concrete below the level of the half pipe. The pipe shall be carefully anchored against flotation.

Concrete bedding, haunching, arch or surround to pipes shall be discontinuous at flexible pipe joints. Shaped formwork made from fibreboard, polystyrene or other equally compressible material of the thickness stated on the Drawings and of size and shape equal to the net section of the concrete protection to the pipes shall be used and left at the pipe joints as shown on the Drawings.The formwork shall be neatly cut and properly supported by temporary struts and rails where necessary.

Where the concrete is not carried up to the crown of the pipe the spaces between the barrel ofthe pipe and the sides of the trench shall be filled with carefully compacted Type A granular material, in roads, road margins and in fields where suitable material is not available. Type A material at least 300mm deep after compacting and the full width of the trench shall be placed in two equal layers over the crown of the pipe each layer being lightly tamped by hand. In all other cases, Type B granular material can be substituted for Type A fill.

TERMINAL/ACCESS FITTINGS

610 ROAD GULLY:
Precast concrete fully to **B.S.3921** Class B 30N engineering in 1:3 mortar C/20.
Road gully gratings and frames shall be cast iron and shall comply with **IS EN 124:1994.**
Precast concrete gullies shall comply with the relevant provisions of **BS 5911 : Part 2 :**
Gully chambers shall be constructed to the details shown on the standard detail drawings which form part of the Contract Documents.

PLASTIC GULLY:
- Roddable plastic trapped gully with vertical back inlet 100 mm outlets and grating to suit.
Concrete Grade C20 bed and surround to gully.
Formwork to produce fair finish.

614 ROAD GULLY FOR CONNECTION TO STORM DRAINAGE SYSTEM:
- Rectangular untrapped precast concrete gully chamber with internal dimensions 300 mm x 385 mm x 750 mm deep and 150 mm diameter. Outlet conforming in all other respects with the requirements of BS.5911 Part 2 with dimensions appropriate to a gully of internal diameter 375 mm as defined in Table 3 BS.5911 Part 2.
- Heavy duty gully grating in cast ductile iron to BS.497 Ref.GA2 – 325 kitemark certified, hinged at one and so that it cannot be removed from the frame.
- Place grating

615 PRECAST CONCRETE COVER SLABS:
- Concrete: Grade C30
- Formwork: Sawn
- Reinforcement: 12 mm diameter mild steel bars at 150 mm centres both ways.

616 CAST IRON MANHOLE COVERS AND FRAMES FOR MANHOLES NOT EXCEEDING 4.0 M DEEP IN CARRIAGEWAYS AND PUBLIC FOOTPATHS ADJACENT TO CARRIAGEWAYS:

- To B.S.497 Type: Grade A cover and frame, back coated with 610 mm clear opening to BS.497 Table 1 Reference MA-60 with single seal, kitemark certified.
- Fix frame on 1:3 courses of brickwork built with concrete bricks to BS.6073 Part 1, strength 30 N/mm sq.
- Bed frame solidly in 1:3 cement:sand mortar over its whole area, centrally over finishes or with any adjacent building.
- Where the cover is not in a paved area, sit the frame in Concrete Grade C20, 1200 mm x 1200 mm x frame depth.
- Manhole covers for foul and surface water drains must have the letters FS and SW respectively cast on the lids. The letters must not have less than 35 mm high.

617 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.

618 MANHOLE COVERS AND FRAMES

Manhole covers and frames shall comply with the requirements of IS EN124 & BS497. Loading requirements are as follows:-

Location	Loading
(1) All Roads Class	D400
(2) Public Footpaths	Class C250
(3) Private Footpaths, Driveways & Parking Areas	Class B125
(4) Gardens, Fields etc.	Class B125

For manholes on Sewer Lines up to and including 450mm diameter non-rocking BS497 Grade "A" double triangular covers and frames in Ductile Iron with 600mm square openings, Type Chieftain or similar, are specified throughout.

Access covers for house connections shall be Trojan type or similar with 600mm x 450mm clear openings where vehicular access is possible. For locations inaccessible to motor vehicles on house connection lines BS497 Grade "C" covers and frames in Ductile Iron and with 600mm x 450mm openings shall be permitted.

All access covers shall have closed keyways. In certain locations where flooding is anticipated fully watertight covers to special design as specified shall be provided and fixed as detailed on the Drawings.

Manhole covers and frames shall be fixed in the positions indicated. Frames shall be solidly bedded in sand/cement mortar (2:1) so that the covers when in position are fair and even with adjacent surfaces. Where indicated on the Drawings or described in the Specification frames shall be bedded on from one to three courses of engineering brickwork in cement mortar.

619 INSTALLATION OF FITTINGS:

- Set fittings square with and tightly jointed to adjacent construction as appropriate. If open to doubt obtain instructions.
- Bed and surround fittings, traps, etc. in concrete, 150 mm thick, mix as specified under Generally.
- Permissible deviation in level of gully gratings to be +0 to - 10 mm,

- Fit purpose made temporary caps over exposed openings in fittings and protect from site traffic.

MANHOLES/CHAMBERS/SOAKAWAYS/TANKS

710 BRICK/BLOCK MANHOLES/INSPECTION CHAMBERS:
- Drawing reference(s): CT 360
- Bases: 200 mm thick RC concrete, mix as specified ON DRAWINGS
- BLOCKWORK: as specified ON DRAWINGS
- Steps: to BS 1247.
  Bed in joints to all chambers over 900 mm deep at 300 mm vertical centres staggered 300 mm horizontally, with lowest step not more than 300 mm above benching and top step not more than 450 mm below top of cover.
- Channels, branches and benching: as specified ON DRAWINGS
- Cover slabs: precast or in situ concrete at Contractors discretion. If precast, bed solid in 1:3 cement:sand mortar to brickwork.
  Openings to suit required access covers.
  Concrete mix as specified as specified ON DRAWINGS
  To BS 5911 Kitemark certified, all components from the same manufacturer.

740 PLASTICS INSPECTION CHAMBERS

751 GRANULAR FILL SOAKAWAY(S): AS INDICATED ON THE DRAWINGS
- Geotextile membrane: _____
- Vertical inspection/distributor pipe(s): Size DN 225 _____, perforated for full depth of granular fill, unperforated above.
  Inspection cover(s): _____
- Horizontal distributor pipe(s): _____
- Granular material: Clean broken bricks, crushed rock or gravel, size range 150 mm to 50 mm.
- Line bottom and sides of pit with geotextile membrane. Insert vertical inspection/distributor pipe(s) and horizontal distributor pipe(s) if required. Fill up to invert level of inlet pipe with granular material. Cover top with geotextile membrane before connecting inlet pipe to inspection/ distribution pipe. Backfill with as-dug material.

760 CONVENTIONAL CHANNEL(S), BRANCHES AND BENCHING:
- Bed main channel solid in 1:3 cement:sand mortar. Connect branches to channel, preferably at half pipe level, so that discharge flows smoothly in direction of main flow. Connect branches greater than nominal size 150 mm with the soffit level with that of the main drain. Where the connecting angle is more than 45 degrees to direction of flow use three-quarter section channel bends.
- Use clips or ensure adequate mechanical key when bedding plastics channels on to mortar.
- Form benching in concrete, mix as specified under Generally, to rise vertically from top of main channel to a level not lower than soffit of outlet pipe, then slope upwards at 10% to walls. Within 3 hours float with coat of 1:3 cement:sand mortar and finish smooth with steel trowel.

762 PREFORMED PLASTICS CHANNEL(S), BRANCHES AND BENCHING:
- Manufacturer and reference: TO BE APPROVED BY THE ENGINEER
  Sizes and integral branches to suit each manhole.

- Remove temporary caps as necessary and make pipework connections. Bed component on base in 1:3 cement:sand mortar. Form concrete benching, mix as specified under Generally, with 10% fall from manhole walls to component rim. Within 3 hours float with coat of 1:3 cement:sand mortar and finish smooth with steel trowel.

765 SEALED ACCESS FITTING(S), BRANCHES AND BENCHING:
- Sealed access fitting(s): TO BE APPROVED BY THE ENGINEER
  Manufacturer and reference: _____
  Sizes and integral branches to suit each manhole.
- Make pipework connections and fit caps to unused branches. Lay component on base and bed in 1:3 cement:sand mortar. Form concrete benching, mix as specified under Generally, with 10% fall from manhole walls to component rim. Within 3 hours float with coat of 1:3 cement:sand mortar and finish smooth with steel trowel.

781 PETROL INTERCEPTOR UNIT(S):
- Manufacturer and reference: TO BE APPROVED BY THE ENGINEER
  Capacity: _____ litres.
  Inlet pipe: _____, nominal size ___ mm
  Outlet pipe: _____, nominal size ___ mm
- Vent pipes: _____, nominal size ___ mm, manifolded above ground, terminating at least 2.4 m above ground level.
- Installation drawing reference(s): _____
- In situ concrete base: 150 mm thick plain concrete, mix as specified under Generally.
- Concrete surround: Fill tank with water then encase tank and access shafts with mass concrete to fully support tank and not less than 150 mm thick, mix as specified under Generally.
- Access covers and seating: _____

811 CAST IRON ACCESS COVERS AND SEATING:
- Covers: Grey iron or ductile iron to BS EN 124.
  Manufacturer: TO BE APPROVED BY THE ENGINEER
  Type(s):
  TO BE APPROVED BY THE ENGINEER
- Seating: Make up in engineering bricks to BS 3921,
  Class B, laid in 1:3 cement:sand mortar, or precast concrete cover frame units, Type 1 or Type 2 to suit cover shape.
- Bed and haunch frame solidly in 1:3 cement:sand mortar over its whole area, centrally over opening, top level and square with joints in surrounding finishes. Cut back top of haunching to 30 mm below top of surface material.

835 LIFTING KEYS: Provide suitable lifting keys for each type of access cover and hand over to the Employer at Practical Completion.

855 OUTLET HEADWALLS:
- Drawing reference(s): _AS INDICATED ON THE DRAWINGS
- Concrete base: 200 mm thick plain in situ concrete, mix as specified under SECTION E
- Brick/blockwork: Type F10/___
- Splash plate:
- Vermin grating: 25 mm maximum mesh to extend 75 mm beyond pipe opening on all sides, fish-tail straps for building-in and hinges in mild steel, galvanized to BS 729 after fabrication.

861 CONNECTIONS TO SEWERS: Connect new pipework to existing adopted sewer(s) to the requirements of the Sewerage Authority or its agent.

CLEANING/TESTING/INSPECTION

900 CLEANING:

- On completion of construction, and before any sterilisation of watermains or before any connections are made to sewers internal surfaces of pipelines shall be cleaned thoroughly in such a way as to remove all oil, grit and other deleterious matter without damage to the pipes.Flush out the whole of the installation with water to remove all silt and debris before final testing, before CCTV inspection if specified and immediately before handover.
- Safely dispose of washings and any detritus without discharging them into sewers or watercourses.

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.

Gravity pipelines laid in open cut shall be tested after they are jointed and before any concreting or backfilling is commenced, other than such as may be necessary for structural stability whilst under test. The pipeline shall be tested by means of an air or water test or by a visual examination, in lengths determined by the course of construction, in accordance with a programme approved by the Engineer.

A further test shall be carried out after the backfilling is complete.
Any defective leaky or porous pipes shall be immediately replaced and the testing repeated.

Water Test. The test presssure for gravity pipelines shall be not less than 1.2 metres head of water above the pipe soffit at the highest point and no greater than 6 metres head at the lowest point of the section. Steeply graded pipelines shall be tested in stages in cases where the maximum head, as stated above, would be exceeded if the whole section were tested in one length. The pipeline shall be filled with water and a minimum period of two hours shall be allowed for absorption, after which water shall be added from a measuring vessel, at intervals of 10 minutes and the quantity required to maintain the original water level noted. Unless otherwise specified, the length of pipeline shall be accepted if the quantity of water added over a 30 minute period is less than 0.5 litres per lineal metre per metre or nominal bore. Notwithstanding the satisfactory completion of the above test, if there is any discernible leakage of water from any pipe of joint, the pipe shall be replaced and/or the joint remade, as appropriate, and the test repeated until leakage is stopped.

Air Test. Gravity pipelines to be air tested shall have air pumped in by suitable means until a pressure of 100mm head of water is indicated in a U-tube connected to the system. The pipelines shall be accepted if the air pressure remains above 75mm head of water after a period of 5 minutes without further pumping following a period for requisite stabilisation. Drains, which incorporate traps, can be tested only to 50mm head of water. The permissible loss is then 12.5mm head of water in 5 minutes. Air pressure can be affected by temperature changes or by defects in the testing apparatus. Consequently, failure to pass this test is not conclusive and, when failure does occur, a water test should be made and the leakage rate determined before a decision as to acceptance or rejection is made.

Gravity pipelines and manholes shall be tested for infiltration after the backfilling. All inlets to the system shall be effectively closed, and any residual flow shall be deemed to be infiltration. The pipeline, including manholes shall be accepted as satisfactory if the infiltration, including infiltration into manholes, in 30 minutes does not exceed 0.5 litres per lineal metre per metre of nominal bore. Notwithstanding the satisfactory completion of the above test, if there is any discernible flow of water entering the pipeline at a point which can be located either by visual or TV inspection, the Contractor shall take such measures as are necessary to stop such infiltration.

930 TESTING OF ADOPTABLE AND LARGE PRIVATE SEWERS:

- Test sewers up to and including DN 750 size in accordance with BS 8005:Part 1 as follows:
- Initially, before backfilling, by air test as paragraph 13.3.
- Finally, after backfilling, by water test as paragraph 13.4.
- Test sewers over DN 750 size before and after backfilling with appropriate equipment on short sections or at joints in accordance with BS 8005:Part 1, paragraph 13.5.
- After backfilling check at manholes for infiltration into sewers in accordance with BS 8005:Part 1, paragraph 13.6.

940 WATER TESTING OF MANHOLES/INSPECTION CHAMBERS: Before backfilling test each manhole or chamber in accordance with BS 8301, paragraph 25.7 for:

- Exfiltration: Drop in water level to be not more than relevant dimension in Table 9.
- Infiltration: Inflow to be not more than 5 litres per hour per manhole.

960 WATER TESTING OF PRIVATE PRESSURE PIPELINES:

- Test pipelines to BS 8301, paragraph 25.8 et seq. not less than 24 hours after completion of joints and installation of anchorages.
- Commission the pumping system, and check that the operation of the complete installation is satisfactory under normal working conditions.

Gauges used for testing pressure pipelines shall either be of the conventional circular type, not less than 300mm diameter, calibrated in metres head of water, or shall have a digital indicator capable of reading increments of 0.1 metre head. Before any gauge is used, the Contractor shall arrange for it to be checked independently, and a dated certificate of its accuracy shall be provided.

The pipelines shall be tested in lengths determined by the Course of Construction in accordance with a Programme approved by the Engineer. Initially the testing will be carried out on Sections of maximum length of 500 metres.

In general and unless otherwise stated the site test pressure of any pipe shall be not less than 1.5 times the working pressure and shall not exceed the works test pressure for that

pipe material. Further information on testing pipes is contained in the relevant Standard Specification for that pipe material

Before testing, valves shall be checked and sealed, the Sections of main filled with water and the air released. After having been filled, pipelines shall be left under working pressure for a period of 24 hours so as to achieve conditions as stable as possible for testing.

The pressure in the pipeline shall then be raised steadily until the specified test pressure is reached in the lowest part of the section and the pressure shall be maintained at this level, by pumping if necessary for a period of one hour. At the end of this period the original pressure shall be restored by pumping and the loss measured by drawing off water from the pipeline until the pressure as at the end of the test is again reached.

The permissible loss shall not exceed 2 litres per 100mm nominal bore per kilometre length per 10 metres head (calculated as the average head applied to the section) per 24 hours.

In addition to the tests on separate sections, the whole pipeline shall be tested on completion to the same pressure and by the same procedures as that outlined for individual sections.

All defective pipes whether cracked, porous, leaky or showing other faults shall be replaced with new pipes. All leaking joints shall be made good.
Before testing any pipeline, the Contractor shall ensure that it is anchored adequately and that thrusts from bends, branch outlets or from the pipeline ends are transmitted to solid ground or to a suitable temporary anchorage.
Open ends shall be stopped with plugs, caps or blank flanges properly jointed. The Contractor shall ensure that the pipelines are tested in a safe manner.

The Contractor shall notify the Engineer at least one clear working day beforehand of his intention to test a section of pipeline.

965 INSPECTION OF GRAVITY PIPELINES

A T.V. Inspection shall be carried out on all gravity sewers of diameter less than 900mm while a visual inspection shall be carried out on Sewers of 900mm nominal diameter or over. Where internal inspection of pipelines by closed circuit television is required, the Contractor shall provide all necessary equipment, including suitable covered accommodation for viewing the monitor screen, together with personnel experienced in the operation of the equipment and interpretation of results.
The intensity of illumination within the pipe and the rate of draw of the camera shall be such as to allow a proper examination of the inside of the pipe. Provision shall be made for the movement of the camera to be stopped and its position recorded and for permanent photographs to be taken at any point requested by the Engineer.

For the Visual Inspection of gravity sewer lines of nominal diameter 900mm or over the Contractor shall provide lighting by means of generator or otherwise. The Contractor shall include for having Photographs taken in the pipelines in conjunction with the visual inspection at the locations required by the Engineer but based on two photographs at intervals of 25 metres. The Contractor shall also provide assistance for the carrying out of such visual inspection.

970 CCTV INSPECTION OF PIPELINES

- Using CCTV, survey all pipelines serving 6 or more dwellings within the project and record on video tape all silent features of their structural and service conditions.

- The CCTV survey should be carried out when:-
  1. All planned lateral connections have been made and the remaining junctions and laterals are properly capped.
  2. All debris has been removed from both laterals and pipelines.
  3. All underground services are installed and no further excavation is planned in the vicinity of the pipeline.
- All CCTV equipment and technical standards shall comply with the specification of the Water Research Centre as contained in their Model Contract Document for Non Man Entry Sewer Inspection.
- Where defects are exposed in the pipelines they shall be remedied by the contractor at his own expense and a further CCTV survey carried out also at his expense. When a final survey acceptable to the Architect has been carried out, the contractor shall arrange for a copy of the video recording to be given to the Architect.
- The video recording shall be of a Video Home System (VHS) format on unused best quality High grade (HG) video cassette tape.
  At the start of each manhole length of the video shall clearly display in Alpha-Numeric from the following information:
  1. Camera's metreage position in the sewer line
  2. Sewer dimensions
  3. Manhole/pipe length reference numbers
  4. Date of survey
  5. Road name/location
  6. Direction of survey
  7. Time of start of survey
  8. Sewer use

980 ANCHORAGE OF PIPES AND FITTINGS

Except where self-anchoring joints are used, thrusts, where there is a change of direction, a cap end, tee connection or gradient exceeding 1 in 6, shall be resisted by concrete thrust blocks cast in contact with undisturbed ground. The blocks shall be constructed in Grade 20 concrete. Any additional excavation required to accommodate thrust blocks shall be carried out after the bend or branch is in position and the thrust face shall be trimmed back to remove all loose orweathered material immediately prior to concreting. Thrust blocks shall be allowed to develop adequate strength before any internal pressure is applied to the pipeline. No joint or part of a joint shall be encased in an anchor block.

990 FLUSHING AND STERILIZING WATERMAINS

Before the works are handed over the Contractor shall flush out and sterilise the entire pipeline system. Flushing and sterilizing shall be carried out before house connections are made unless otherwise directed. Any connections, which may have been made to the mains, shall be closed.Water for the flushing operation shall be potable water.

The flushing and sterilizing shall continue until the Engineer is satisfied that all foreign matter of deleterious character has been entirely removed from the mains or rendered innocuous.

For sterilization, liquid chlorine, dry chlorine, or calcium hypochlorite may be used, and the various supply and distribution systems shall be divided into convenient sections and systematically treated with sterilant. Before starting the work the Contractor shall submit full details of his proposals including disposal of the chlorinated water to the Engineer for his approval.

Chlorine shall be injected at the upstream end of the pipeline section to be sterilised at such a rate that the residual chlorine available at the downstream (Scour) end shall be 10 parts per million. When this residual has been achieved the mixture in the main shall be allowed to stand for two hours minimum. The main shall then be emptied and thoroughly flushed. Care shall be taken in the chlorination, emptying and flushing of the main that the heavily chlorinated mixture does not contaminate existing watermains or existing watercourses, drains or streams.

Sluice Valves and Scour Valves

Sluice Valves and Scour Valves shall comply with the requirements of BS 5163 and have a 16 Bar Rating unless otherwise detailed in the Contract and have N.P. 16 flanges. Valves are to be inside screw valves with non-rising spindles. The spindles of underground valves shall be fitted with cast iron caps secured with set screws or pins, while valves above ground shall be fitted with cast iron hand wheels, on which the direction of opening is to be marked. All valves are to be clockwise closing.

Valves are to be hydraulically tested during manufacture in accordance with BS 5163 and a manufacturer's test certificate shall be produced for each valve on request. All sluice valves are to be flanged unless otherwise specified.

Where necessary valves shall be fitted with extension spindles or universal joint operating rods and headstocks or spindle caps as appropriate. All valves shall be closed and open-end tested.

All machined surfaces of valves shall be supplied with a protective coating of a non-toxic bituminous composition applied by a hot-dipped process. Machined surfaces, liable to rusting, shall be well covered with a rust preventative composition.

All valves shall be clearly marked with the appropriate schedule reference number. Large items shall be so marked in two places for ease of identification.
Unless otherwise specified the Sluice Valve Surface Boxes shall be Cast Iron 100mm diameter with a clear opening 200mm deep.
Electric actuators for Sluice Valves are to be sealed watertight actuators of approved manufacture, suitable for use in the Hydraulic Conditions obtaining.

Air Valves

Air Valves, whether for sewage or potable water, shall be the product of an approved manufacturer and shall have bodies and covers of best tough cast iron, with flanged inlets of the size specified below. Unless otherwise specified, Dual (Double) Air Valves shall be used, having a large and a small air escape orifice, with rubber or vulcanite balls and rubber seatings. They shall be fitted with screw down type isolating valve having a forged bronze screwed spindle with cast iron cap and gunmetal valve and seat.

The small orifice shall be capable of permitting the escape of air under the maximum working pressures appropriate to the Class of pipe and the Valves shall be tested during manufacture to at least 50% in excess of the maximum working pressure.

Kinetic Double Air Valves where specified are to be mounted on butterfly isolating valves. They are to have flanged inlets of not less than 80mm diameter.
Unless otherwise specified the Air Valve Surface Boxes shall be Cast Iron 450mm x 300mm x 150mm deep with a perforated cast iron cover.

Hydrants

Hydrants, hydrant boxes and covers shall comply with the relevant provisions of BS 750.

Hydrants shall be screw down streamline pattern with 80mm inlets and 63mm male thread outlets.
Hydrant box covers shall be provided with recesses for lifting keys.
Hydrant indicator plates shall comply with relevant provisions of BS 3251.
Unless otherwise specified the Hydrant Surface Boxes shall be Cast Iron 375mm x 225mm x 150mm deep with an approved identification mark on cover.

Surface Boxes and Guards
Small surface boxes shall comply with the relevant provisions of BS 5834, Part 2.
Guards for underground stopvalves shall comply with the relevant provisions of BS5834, Part 1.

Pipeline Fittings and Accessories
Unless otherwise particularly specified or directed the following standards shall apply to fittings:-
Stopcocks BS 5433
Marker Posts IS 162

Unless otherwise specified the materials, dimensions and finishes of appurtenances shall be as follows.
Stopcock Covers: Cast Iron 90mm clear opening 50mm deep. Cover to be hinged and appropriately marked.
All valve and hydrant chambers shall be constructed to the details shown on the drawings.

Draw Cord
Draw cord for duct threading shall be 8mm diameter 3 Strand hawser laid polypropylene rope complying with IS EN 697 or IS EN 699

PTFE Tape
Unsintered polytetrafluorethylene (PTFE) tape for thread sealing applications shall comply with THE REQUIREMENTS OF THE UTILITY PROVIDER and BS 7786.

Z10 PURPOSE MADE JOINERY

To be read with Preliminaries/General conditions.

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, wooliness, 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, thicknessed, 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.

210 LAMINATED PLASTICS VENEERS:
- Apply sheets in accordance with 'Recommendations for the fabrication of decorative laminated sheets' published jointly by the British Plastics Federation and the British Laminated Plastics Fabricators' Association.
- Condition sheets before bonding. When not otherwise specified, apply to the reverse side of flat boards a balancing veneer of similar construction to the decorative veneer and from the same manufacturer.
- Bond in presses whenever possible.
- Finished components to be free from bow, twist, scratches, chipping, cracks, pimpling, depressions, glue spill, staining, defects in colour and pattern and the like.
- All joints exposed to view in the finished work to be tight butted and true with no lipping. Chamfer edges at all external angles.

220 WOOD VENEERS:
- Condition core material and veneers before bonding. When not otherwise specified, apply to the reverse side of flat boards a balancing veneer with the same moisture and temperature movement characteristics as the facing veneer.
- Set out veneers so that features and pattern are aligned and in regular, uniform symmetry unless specified otherwise. Apply veneers with edges tight butted, no gaps or other open defects and no lipping.
- Bond in presses whenever possible.
- Finished components to be free from bow, twist, scratches, chipping, pimpling, depressions, glue spill, staining and the like.
- Sand to a fine, smooth finish free from sanding marks.

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.

Z11 PURPOSE MADE METALWORK

To be read with Preliminaries/General conditions.

110 MATERIALS GENERALLY:
- Grades of metals, section dimensions and properties to be to the appropriate British Standard. When not specified, select grades and sections appropriate for the purpose.
- Prefinished metal may be used if methods of fabrication do not damage or alter appearance of finish and finish is adequately protected.

- Fastenings to be to the appropriate British Standard and, unless specified otherwise, to be of the same metal as the component, with matching coating or finish.

120 FABRICATION GENERALLY:
- Fabricate components carefully and accurately to ensure compliance with design and performance requirements.
- Do not permit contact between dissimilar metals in components which are to be fixed where moisture may be present or occur.
- Finished components to be rigid and free from distortion, cracks, burrs and sharp arrises. Moving parts must move freely and without binding.
- Unless specified otherwise, mitre corner junctions of identical sections.

130 COLD FORMED WORK: Use brake presses or cold rolling to produce accurate profiles with straight arrises.

140 ADHESIVE BONDING:
- Prepare surfaces of metals to receive adhesives by degreasing and abrading mechanically or chemically.
- Use adhesives to manufacturer's recommendations.
- Form bond under pressure.

150 THERMAL CUTTING OF STAINLESS STEEL: After cutting, grind off material which is liable to corrode.

170 WELDING/BRAZING GENERALLY:
- Thoroughly clean surfaces to be joined.
- Ensure accurate fit using clamps and jigs where practicable. Use tack welds only for temporary attachment.
- Make joints with parent and filler metal fully bonded throughout with no inclusions, holes, porosity or cracks.
- Prevent weld spatter falling on surfaces of materials which will be self-finished and visible in completed work.
- Remove all traces of flux residue, slag and weld spatter.

180 WELDING OF STEEL: Metal arc welding to BS 5135, or other methods subject to approval.

190 WELDING OF STAINLESS STEEL: TIG welding to BS 7475, or other methods subject to approval. Use double bevel butt welds, backing bars to remove heat, jigging, tack welds and any other measures necessary to minimise distortion. Remove slight distortion by light hammering, taking care not to damage surface finish.

200 WELDING OF ALUMINIUM ALLOYS: TIG welding to BS 3019: Part 1, or MIG welding to BS 3571:Part 1, or other methods subject to approval.

220 BRAZING: To BS 1723.

230 BRONZE WELDING: To BS 1724.

250 FINISHING WELDED/BRAZED JOINTS:
- Butt joints which will be visible in completed work to be smooth, flush with adjacent surfaces.
- Fillet joints which will be visible in completed work to be executed neatly. Grind smooth where specified.

310 APPLYING COATINGS:
- Apply after fabrication is complete and all fixing holes have been drilled, unless otherwise specified.
- Before applying coating remove all paint, grease, flux, rust, burrs and sharp arrises.
- Make good all defects which would show after application of coating and finish surfaces smooth.

320 LIQUID ORGANIC COATING FOR ALUMINIUM ALLOY COMPONENTS: To BS 4842.

340 CADMIUM/ZINC PLATING OF IRON AND STEEL SURFACES: To BS 1706.

350 CHROMIUM PLATING: To BS 1224.

360 GALVANIZING: To BS 729.

370 VITREOUS ENAMELLING OF STEEL SURFACES: To BS 3830.

380 ANODIZING: To BS 1615 unless specified otherwise. Provide a certificate of assurance that anodizing has been carried out as specified.

Z12 PRESERVATIVE/FIRE RETARDANT TREATMENT

To be read with Preliminaries/General conditions.

110 GENERALLY:
- Application to be carried out after cutting and machining, but before assembly, by a processor licensed by the treatment solution manufacturer for the specified treatment.
- For each batch of timber, provide a certificate of assurance that treatment has been carried out as specified.

120 BWPDA COMMODITY SPECIFICATIONS, where specified, are those defined in the latest edition of the British Wood Preserving and Damp-proofing Association Manual. Solution strengths and treatment cycles to be selected to achieve the service life (if specified) and to suit timber treatability.

150 CCA PRESERVATIVE TREATMENT:
- Based on oxides of copper, chromium and arsenic.
- Moisture content of timber at time of treatment to be not more than 28%. Allow timber to dry for at least 14 days before use.
- Application: High pressure.
- Preservative solution manufacturer and reference:

160 ORGANIC SOLVENT PRESERVATIVE TREATMENT:
- Moisture content of timber at time of treatment to be as specified for the component at time of delivery. After treatment, timber to be surface dry before use.
- Application: Double vacuum/low pressure.
- Preservative solution manufacturer and reference:

170 CREOSOTE PRESERVATIVE TREATMENT:
- Moisture content of timber at time of treatment to be not more than 28%. Allow timber to dry before use.
- Application: High pressure or immersion.
- Preservative solution manufacturer and reference:

210 FIRE RETARDANT TREATMENT:
- Moisture content at time of treatment to be as specified for the timber at time of fixing. After treatment, timber to be dried slowly at temperatures not exceeding 65 deg C to minimise degradation and distortion.
- Application: Vacuum/pressure.
- Fire retardant solution manufacturer and reference:

220 LEACH RESISTANT FIRE RETARDANT TREATMENT:
- Moisture content at time of treatment to be as specified for the timber at time of fixing or:
  22% for timbers up to 50 mm thick
  25% for thicker timbers
  whichever is the lesser.
- Application: Vacuum/pressure.
- Fire retardant solution manufacturer and reference:

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 fasteners which are suitable having regard to:
- Nature of and compatibility with product/material being fixed and fixed to,
- Recommendations of manufacturers of fasteners 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 FASTENERS for materials and components forming part of external construction to be of corrosion resistant material or have a corrosion resistant finish.

130 FASTENERS for materials and components:
- Forming part of external construction but not directly exposed to the weather to be of corrosion resistant material or have a corrosion resistant finish.
- Directly exposed to the weather to be of corrosion resistant material.

140 FIXING THROUGH FINISHES: Ensure that fasteners and plugs (if used) have ample penetration into the backing.

150 PACKINGS:
- Provide suitable, tight packings at fixing points to take up tolerances and prevent distortion.
- Use noncompressible, rot proof, noncorrodible materials positioned adjacent to fixing points.
- Ensure that packings do not intrude into zones that are to be filled with sealant.

160 CRAMP FIXING:
- When not specified otherwise, position cramps not more than 150 mm from each end of frame sections and at 600 mm maximum centres.
- Secure cramps to frames with matching screws as masonry work proceeds, and fully bed in mortar.

170 NAILING:
- Nails: To BS 1202.
- In joints, use not less than two nails and opposed skew nailing unless specified otherwise.
- Drive nails fully in without splitting or crushing the material being fixed.
- Punch nail heads below surfaces that will be visible in the completed work.

180 MASONRY NAILS: Do not use without approval.

210 PLUGS:
- Proprietary types selected to suit the background, loads to be supported and conditions expected in use.
- Locate plugs accurately in correctly sized holes in accordance with manufacturer's recommendations.

220 SCREW FIXING:
- Screws: To BS 1210.
- All screws to have clearance holes. Screws of 8 gauge or more and all screws into hardwood to have pilot holes about half the diameter of the shank.
- Before using brass, aluminium or other soft metal wood screws precut the thread with a matching steel wood screw.
- Do not hammer screws unless specifically designed to be hammered.
- Drive countersunk heads flush with timber surface, or not less than 2 mm below it if they are to be stopped.
- Washers and screw cups, where specified, to be of the same material as the screw.

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. Pellets to occupy the whole depth of the holes and be finished off flush with surface.

240 PLUGGING: Countersink screw heads 6 mm below timber suface and glue in plugs. Plugs to occupy the whole depth of the holes and project from the surface.

250 POWDER ACTUATED FIXING SYSTEMS:
- Do not use without approval.
- Tools to be to BS 4078:Part 2 and Kitemark certified, and used in accordance with BS 4078:Part 1. Operatives to be trained and certified as competent by tool manufacturer.
- Fasteners, accessories and consumables to be types recommended by the tool manufacturer.
- Ensure that operatives take full precautions against injury to themselves and others.
- Remove all unspent cartridges from the site when no longer required.
- Apply zinc rich primer to heads of fasteners used externally, in external walls or in other locations subject to dampness.
- Use top hat section plastics washers to isolate cartridge fired nails from stainless steel components fixed externally, in external walls or in other locations subject to dampness.

510 ADHESIVES:
- Adhesive types: As specified in the relevant section.
- Surfaces to receive adhesive to be sound, unfrozen, free from dust, grease and any other contamination likely to affect bond. Where necessary, clean surfaces using methods and materials recommended by adhesive manufacturer.
- Adjust surface regularity and texture as necessary to suit bonding and gap filling characteristics of adhesive.
- Ensure that operatives observe manufacturer's and statutory requirements for storage and safe usage of adhesives.

- Do not use adhesives in unsuitable environmental conditions or beyond the storage period recommended by the manufacturer.
- Apply adhesives using recommended spreaders/applicators to ensure correct coverage. Bring surfaces together within recommended time period and apply pressure evenly over full area of contact to ensure full bonding.
- Remove surplus adhesive using methods and materials recommended by adhesive manufacturer and without damaging surfaces.

Z21 MORTARS

To be read with Preliminaries/General conditions.

CEMENT GAUGED MORTARS

110 MORTAR MIX PROPORTIONS: and other particular requirements are specified elsewhere.

120 SAND FOR MORTAR:
- To B.S.1200 unless specified otherwise.
- Sand for facework mortar to be from one source, different loads to be mixed if necessary to ensure consistency of colour and texture
- When a range is specified (e.g. 1:5-6) use lower proportion of sand for Grade G sands and higher proportion for Grade S.

140 COLOURED LIME: SAND MIX: (Pre-mixed): Coloured mortar, where required to be made using a proprietary coloured ready-mixed lime:sand to B.S.4721, colour to approval where not specified.
Manufacturer: Redland Mortars.

160 CEMENT FOR MORTAR: When not specified otherwise, to be ordinary or rapid hardening Portland cement or blast furnace cement. All cements must comply with the appropriate British Standard and be manufactured by a BSI Registered Firm of Assessed Capability.

180 ADMIXTURES: Do not use in mortar unless specified or approved. Do not use calcium chloride or any admixtures containing calcium chloride. Admixtures, if specified, to be to B.S.4887.

210 MAKING MORTAR:
- 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. Do not overmix mortars containing air entraining admixtures.
- Use mortar within about two hours of mixing at normal temperatures. Do not use after the initial set has taken place and do not retemper.
- Keep plant and banker boards clean at all times.

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.

110 POWDER COATING: This is invoked by reference in other sections.

120 POWDER COATING MATERIALS are to be obtained from one only of the following manufacturers. Inform the CA of selected manufacturer at an early date.

210 WORKING PROCEDURES: Unless specified otherwise, comply with all relevant requirements and recommendations of:
- BS 6496 for aluminium alloy backgrounds.
- BS 6497 for galvanized steel backgrounds.
- British Coatings Federation: Code of safe practice - Application of powder coatings by electrostatic spraying.

220 APPLICATOR REQUIREMENTS:
- Powder coatings must be applied by an applicator approved by the powder coating manufacturer. Provide evidence of approval to the CA on request.
- Use only one plant of the applicator wherever practical.
- Ensure that the applicator complies with all quality procedures, standards and tests required by the powder coating manufacturer.
- Ensure that the applicator issues a certificate to the CA on request and before delivery of work to site, confirming that coatings are in accordance with this specification.
- Ensure that copies of the powder coating manufacturer's and/or applicator's guarantees are issued to the CA on completion of work.

230 CONTROL SAMPLES: Prior to ordering materials for the works, obtain approval for:
- Uncoated and powder coated samples of the various grades and forms of background metal to be used.
- Fabrication samples showing joint assembly, how powder coating is affected and how any cut metal edges are protected.

240 TESTING: Independent acceptance testing of powder coatings will be commissioned by the CA in the event of any deficiency in tested production samples or in finished components. Provide production samples for testing and/or provide safe access for site testing when requested by the CA.

250 COMPONENT DESIGN:
- Ensure that components to be powder coated comply with relevant recommendations of BS 4479:Parts 1,3,4, and 6, are of suitable size to fit plant capacity and of suitable thickness to withstand oven curing.
- Ensure that deflection under design load or thermal movement of background metal of components will not be detrimental to powder coatings.

310 PRETREATMENT:
- All components to be powder coated are to be free from corrosion and damage, and suitable for and compatible with the pretreatment and powder coating process.
- Clean, conversion coat, condition, drain and dry all components in accordance with the powder coating manufacturer's requirements and the pretreatment supplier's recommendations.

410 EXTENT OF POWDER COATINGS:
- Apply powder coatings to all surfaces of the following components:
- All surfaces will be deemed 'significant surfaces' for relevant BS 6496/BS 6497 performance requirements.

420 EXTENT OF POWDER COATINGS:
- Apply powder coatings to all visible surfaces of the following components:

- All visible surfaces will be deemed 'significant surfaces' for relevant BS 6496/BS 6497 performance requirements.

430 EXTENT OF POWDER COATINGS:
- Obtain approval of drawn proposals or schedules for component surfaces to receive powder coatings.
- All approved surfaces will be deemed 'significant surfaces' for relevant BS 6496/BS 6497, performance requirements.

440 APPEARANCE OF POWDER COATINGS:
- The quality of finish must be consistent and in accordance with BS 6496/BS 6497, clause 10.2. A slight degree of 'orange peel' texture may be acceptable, subject to approval of the CA and the powder coating manufacturer.
- The gloss level of finish must be consistent and when tested in accordance with BS 6496/BS 6497, clause 4.3 must be within the relevant range given in the powder coating manufacturer's literature.

450 ALUMINIUM ALLOY FABRICATIONS: Units may be assembled:
- Before powder coating.
- From components powder coated after cutting to size.
- From components powder coated before cutting to size, subject to approval of the CA and the powder coating manufacturer.
  Assembly of components resulting in exposure of background metal will not be acceptable.

460 STEEL FABRICATIONS: Wherever practical units must be assembled before powder coating.

470 FIXINGS: All exposed metal fixings must be powder coated together with components, or coated with matching repair paint system applied in accordance with the powder coating manufacturer's recommendations.

480 FABRICATION DAMAGE REPAIR/REPLACEMENT:
- Check all components before delivery to site for powder coating damage. Report findings and proposed method of repair or replacement to the CA and obtain approval before commencing remedial work.
- Repair components with minor damage as soon as possible by cleaning, abrading and coating with matching repair paint system applied in accordance with the powder coating manufacturer's recommendations.
- Replace components with major damage considered unacceptable for repair.
- Stripping and recoating of components will only be acceptable by prior agreement of the powder coating manufacturer. Stripping, pretreatment and powder coating are to be in accordance with manufacturer's requirements.
- Overcoating of components will not be acceptable.

510 PROTECTION:
- All powder coated surfaces of components vulnerable to damage during handling and installation, or by subsequent site operations, are to be fully protected throughout the course of these works.
- Protective coverings are to be resistant to all weathers, removable from areas inaccessible after installation, and partially removable and replaceable for access to fixing points during installation or subsequent site operations.
- Any protective tapes used in direct contact with powder coatings are to be low tack, self adhesive type and light in colour. Their use for application to powder coatings must be

approved by the tape manufacturer. Apply and remove in accordance with the tape manufacturer's requirements and the powder coating manufacturer's recommendations.
- Carry out monthly inspections of protective coverings and promptly repair any deterioration or deficiency.
- Remove protective coverings only when instructed by the CA.

520 PROTECTION MOCK-UPS:
- Provide protection mock-ups of powder coated components as follows:
- Erect protection mock-ups in similar exposure conditions to their proposed installation and agree inspection procedures with the CA.

530 SITE DAMAGE REPAIR/REPLACEMENT:
- Any damage to powder coatings caused during handling and installation, or by subsequent site operations, is to be rectified immediately. Obtain approval before commencing extensive repairs or replacements.
- Repair components with minor damage by cleaning, abrading and coating with matching repair paint system applied in accordance with the powder coating manufacturer's recommendations.
- Replace components with major damage considered unacceptable for repair.

540 MAINTENANCE: After removal of protective coverings, clean and maintain all powder coated surfaces at regular intervals until Practical Completion. All maintenance is to be in accordance with procedures detailed in the powder coating manufacturer's technical literature and the guarantee.

SAFETY FILE INFORMATION TO BE PROVIDED;

Safety File
"Regulation 24" - The Safety, Health and Welfare at Work (General Application) Regulations -

The Safety File is a record of information for the end user, which focuses on safety and health. The information it contains will alert those who are responsible for the structure and services in it of the significant safety and health risks that will need to be addressed during subsequent maintenance, repair or refurbishment, extension, or other construction work or, indeed, its demolition Contractors who have information relevant to the Safety File must promptly pass it on to the Project Supervisor Construction Stage who in turn passes it on to the PSDS to include in the Safety File.

The Contractor shall include all information required by the Construction Regulations 2006, The Contract Documents, Guidelines on the Procurement, Design and Site Management Requirements of the Safety Health and Welfare at Work (Construction) Regulations, 2006 and all other statutory requirements, not limited to the following:

1. Construction drawings, specifications and bills of quantities, used and produced throughout the construction process
2. All design criteria
3. Details of the equipment and maintenance facilities within the structure
4. Maintenance procedures and requirements for the structure
5. Manuals, certificates, produced by specialist contractors/designers and suppliers which outline operating and maintenance procedures and schedules for plant and equipment installed as part of the structure, typically lifts, electrical and Mechanical installations and window cleaning
6. Details of the location and nature of utilities and services, including emergency and fire-fighting systems
7. Certificates of compliance for all subcontractors
8. Certificates of compliance for all Contractor's design consultants
9. Warranties – Material and Workmanship
10. Collateral Warranties
11. All other documentation required by the Contract Documents.