# STANDARD OF WORKMANSHIP AND MATERIALS

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# GENERAL

## GENERAL

### Standards of workmanship and Materials

001 Carry out and complete all Works:
- in accordance with Good Industry Practice;
- in accordance with any specific requirements for those Works in this Specification; and
- to the satisfaction of the Employers Representative (acting reasonably).

002 To the extent that the standard of any Works has not been specified in this Contract, agree the relevant standard for the Works with the Client's Representative before their execution. Where particular Works or working methods are to be "Approved by" "Agreed with" or are indicated to be "subject to the Approval of" the Client's Representative, give the Client's Representative adequate notice when such Approval or Agreement is needed and retain evidence of all Approvals given, and items that have been Agreed, by the Client's Representative.

003 To the extent that it is necessary to design any aspect of the Works, in preparing those Designs use the reasonable skill and care.

004 Maintain all existing lines and levels at all times and carry through new work to the same lines and levels unless otherwise instructed by the Client's Representative.

### European and British Standards & Codes of Practice

005 Ensure all Works undertaken and all Materials used in those Works comply with all applicable European and British Standards and Codes of Practice that are current at the time of their use.

006 References in this Specification of Workmanship and Materials to any European and British Standard or Code of Practice are to be construed as references to the version current at the time the Order is undertaken.

007 Where a specific European and British Standard or a Code of Practice is referred to, this sets out the minimum acceptable standard of Materials or workmanship.

### Materials

008 Where this Specification requires Materials to be matched to existing Materials or finishes, this match is subject to the Approval of the Client's Representative.

009 Do not use any Prohibited Materials in carrying out the Works. Prohibited Materials are those Materials which are generally accepted or (having regard to Good Industry Practice) are reasonably suspected of:
- being harmful in themselves;
- being harmful when used in a particular situation or in combination with other Materials;
- becoming harmful with the passage of time; or
- being damaged by or causing damage to the structure in which they are to be affixed.

010 Materials are to be regarded as harmful if, in the context of their use in the Works (whether alone or in combination with other materials) they:
- are prejudicial to health and safety;
- may pose a threat to the structural stability or the physical integrity of any Property; or could materially reduce the normal life expectancy of any part of the Property.

011 Use, fix and apply all Materials strictly in accordance with the manufacturer's recommendations, directions or instructions.

012 Where appropriate suggest (economically viable) amendments to this Specification where those amendments may lead to an improvement in environmental performance or sustainability.

**EXCAVATION AND EARTHWORK**

## EXCAVATION AND EARTHWORK

### Excavation

001 Leave excavations for the foundations of walls and similar structures exposed until they have been inspected and Approved by the Client's Representative. Do not fill in trenches or holds or cover up the concrete until dimensions have been taken by the Client's Representative.

002 Refill any excessive depth to the proper level with concrete (7N/20mm) as specified in the "Concrete work" Section. Excavate the formation level to such further depth as the Client's Representative Instructs where the bottom of any excavation is found to be soft or otherwise unsound. Fill any extra depth with concrete (for which additional payment is to be made).

003 Any rubble, salvageable building materials and antiquities from the excavations belong to the Client.

004 Check in advance the location of any pipes, cables or any other services when excavations are to be carried out.

### Weed killer

005 Use an organic weed killer Approved by the Client's Representative.

### Disposal of excavated material

006 Cart away any surplus excavated material from the site to a tip.

### Filling

007 Use only clean subsoil free from vegetable soil, roots and rubbish for backfilling around foundations or to make up levels.

### Pumping and baling

008 Keep the bottom of excavations free from storm or percolating water by pumping or other means during and throughout the progress of the Works until their completion.

### Supporting excavations

009 Support all excavations using earthwork supports to ensure the safety of Staff and the Works to the satisfaction of the Client's Representative.

### Work in cold weather

010 Protect excavations against freezing. Do not use frozen materials for backfilling.

### Hardcore

011 Use for hardcore only approved hard dry crushed brick or hard broken rubble stone, or limestone quarry waste, free from mud, dirt, clay, ashes, clinker, asbestos, timber or any other deleterious matter, broken to pass a 75mm diameter ring in all directions, well rolled and consolidated in 100mm layers.

### Blinding

012 Use for blinding only sand, fine gravel, pulverised fuel ash or other fine materials that are free from dust, well rolled and consolidated.

013 Do not use shale either as hardcore or blinding to hardcore.

014 Use sufficient blinding material to fill the surface to provide a close smooth surface for hardcore.

**Generally**

015 Keep excavations and areas to be filled free from soil and rubbish.

**DEMOLITION**

## DEMOLITION

### GENERAL

#### Generally

001 Execute all demolition Works and alterations in the most careful manner to avoid damage to the surrounding structures. Make good any damage caused.

002 Do not allow dangerous portions of any structure to remain standing during idle periods or overnight except where this is unavoidable. Where this is unavoidable, adequately strut and prop such portions to ensure their stability until Works recommence.

003 Load and cart away all materials (including debris) arising from the demolition or alterations. Do not allow these materials to accumulate. Ensure the care and protection of any Materials to be re-used.

004 Bear the risk of any damage in removing, re-fixing and storing old Materials that are set aside for re-fixing. Replace any damaged or defective Materials or missing parts.

#### Survey

005 Before starting the Works, examine all available information, survey the structure(s), site and surrounding area. When requested by the Client's Representative provide a survey report with a method statement covering all relevant matters listed in the Health and Safety Executive Guidance Note GS29/1.

#### Bench marks

006 Report to the Client's Representative any bench marks or other survey information found on the structure(s) to be demolished. Do not remove or destroy unless so instructed in writing.

#### Existing features and adjacent works to be retained

007 Keep in place and adequately protect from any damage all features and adjacent work that are to be retained, as indicated on drawings provided by the Client.

### UTILITIES AFFECTED BY DEMOLITION

#### Regulations affecting utilities

008 Carry out any Works affecting new or existing services in accordance with all applicable Regulatory Requirements.

#### Location of services

009 Locate and mark the positions of services affected by the Works. Arrange with the appropriate Utility Providers for the location and marking of the positions of mains services.

#### Disconnection of services

010 Before starting demolition arrange with the appropriate Utility Provider(s) for the disconnection of services and removal of fittings and equipment unless the drawings provided by the Client state otherwise.

#### Disconnection of drains

011 Locate and disconnect all disused drains connections. Seal within the site all the connections to existing sewers to the approval of [the Utility Provider.

**Drains in use**

012 Protect drains, manholes, gullies, vent pipes and fittings still in use. Keep them free of debris at all times. Make good any damage arising from demolition. Leave them clean and in working order on completion of the demolition works.

**Services which are to remain**

013 Notify the Client's Representative, Utility Provider and Customer of any damage. Repair such damage to the satisfaction of the Client's Representative and Utility Provider.

**WORKMANSHIP**

**Generally**

014 Demolish structure(s) in accordance with the Health and Safety Executive Guidance Notice GS29/1,2,3, and 4.

**Equipment**

015 Use suitable types and standards of cutting and demolition Equipment for the location and type of Works.

**Gas or vapour risks**

016 Take adequate precautions to prevent fire or explosion caused by gas or vapour.

**Flammable liquids & gases**

017 When removing tanks and pipes which may have contained flammable liquids or gases:
- inform the appropriate officer of the Statutory Authority and follow any advice given;
- display danger notices;
- prohibit smoking and the use of naked lights;
- use only non-ferrous tools and equipment, with an ample supply of water, to reduce the risk of sparking;
- empty tanks and dispose of their contents to ensure that none enters any drainage system or watercourse;
- clean tanks and pipes and make them inert as described elsewhere in this Specification or as Instructed by the Client's Representative.

**Dust**

018 Reduce dust by periodically spraying demolition Works with water. Use dust sheets and temporary screens.

**Health hazards**

019 Take adequate precautions to protect Staff and the public from health hazards associated with any dangerous fumes and dust arising during the Works.

020 Perform all Works in such a manner to ensure the safety of the Works and the public and so as to cause the minimum inconvenience to the public.

**Adjoining properties**

021 Leave adequate temporary support and protection for adjoining properties at each stage and arrange for inspection by the Client's Representative when demolishing structure(s).

022 Maintain and alter temporary supports and protection as necessary as the Works progress.

023 Demolish structure(s) causing a minimum of damage to adjoining properties. Leave no unnecessary or unstable projections.

024 Do not disturb any support to the foundations of any adjoining property unless otherwise instructed.

025 Report to the Client's Representative any defects exposed or becoming apparent in any adjoining property.

026 Promptly repair any damage caused to any adjoining property by demolition work. Make good to ensure safety, stability, weather protection and security.

**Structure(s) to be retained**

027 Adequately protect all parts of existing structure(s) which are to be kept in place.

028 Cut away and strip out with care the minimum amount necessary so as to keep the amount of making good to a minimum.

029 Prevent debris from overloading any part of the structure which is not to be demolished.

**Services which are to remain**

030 Notify the Client's Representative and Utility Provider of any damage. Make arrangements for repair to the satisfaction of the Client's Representative and Utility Provider.

**Partly demolished structure(s)**

031 Leave partly demolished structure(s) in a stable condition, with adequate temporary support at each stage to prevent the risk of uncontrolled collapse.

032 Prevent debris from overloading scaffolding platforms.

033 Prevent access to partly demolished structure(s) by unauthorised persons.

034 Leave safe whilst not working at the Property.

**Dangerous openings**

035 Illuminate all openings as necessary.

**Asbestos-based materials**

036 Where asbestos-based materials are known to be present in the structure(s) to be demolished, ensure they are removed in accordance with the Client's Policy for asbestos removal and the Health and Safety Executive's guidance for asbestos removal.

**Unknown hazards**

037 Inform the Client's Representative of any unrecorded voids, tanks, chemicals, etc. discovered during demolition works. Agree with the Client's Representative the methods for safe removal, filling, etc.

**New openings**

038 When forming new openings or altering existing openings:
- cut away existing arches, lintels or sills;
- provide temporary strutting and supports and shoring;
- cut away for hoist and insert new lintels, including cutting and pinning ends;
- cut away for, and insert new sills, including cutting and pinning ends;
- make good floors up to levels for new thresholds, sills etc., including latex levelling screed;
- wedge and pin up to existing work and build up jambs as described;
- extend and make good finishings to match existing as necessary;
- remove all debris from the Property and site; and
- retain supports until the new Works have adequate strength to support the existing structure.

**Taking down**

039 When taking down:
- provide temporary support;
- remove all applied finishes;
- make good finishes and match to existing as necessary;
- make good floors up to levels with latex levelling screed; and
- remove all debris from the Property and site.

**Building up existing openings**

040 When building up existing openings:
- build up in Materials to match existing or as described for the full thickness of the wall;
- cut out existing thresholds, sills, arches, lintels, etc;
- hack off finishings from jambs or reveals before building up;
- prepare surfaces for raising, including lead core or similar damp proof course;
- cut toothing;
- wedge and pin up to existing work as required; and
- extend and make good finishings to match existing as necessary.

**Extending finishings**

041 Match all extensions to finishings, plasterwork, ceilings, flooring etc., and any making good exactly to the existing finishings.

**MATERIALS**

**Ownership**

042 Components and materials arising from demolition (other than any found during excavations) belong to the Service Provider. Remove them from site as the Works proceed.

**Hardcore**

043 Reuse brick, stone and concrete rubble or other hard materials arising from demolition as hardcore, subject to compliance with this Specification.

**Bricks**

044 Use whole, sound bricks arising from the Works for replacing cracked or defective bricks or filling to existing openings.

**Infected Timber**

045 Inform the Client's Representative when infected timber is encountered. Where instructed, remove timber infected by fungal/insect attack from the building in a way which will minimise the risk of infecting other parts of the building. Destroy it as soon as possible.

**Commencement condition survey**

046 Before starting the Works:
- survey the existing state of the Property to be kept in place;
- record the magnitude and extent of all cracks, spalling, flaking and other irregularities of the fabric of the Property; and
- agree the commencement condition survey record with the Client's Representative.

**Extent of support work**

047 Where necessary, provide support systems to those elements of the Property which are to be retained.

048 Provide adequate and stable support systems and thereby maintain the integrity of supported structure for the period of erection to completion of dismantling support systems.

**Workmanship**

049 Carry out all work in accordance with the Order or any design brief issued with it.

050 Use site Staff experienced in the methods of erecting and maintaining support systems to supervise and control the Works.

**Erecting support systems**

051 Locate the positions of existing and new services which may be affected by support systems and provide any necessary temporary diversions.

052 Prevent excessive loadings from foundations of support systems being imposed onto foundations of structure to be kept in place.

053 Erect and connect support systems to structure to be kept in place. Take:
- all necessary precautions to prevent damage; and
- due account of movement of the structure which may occur before, during and after demolition.

054 Promptly repair any damage caused to adjoining properties by the erection or connection of support systems. Make good to ensure safety, stability, weather protection and security.

055 Report to the Client's Representative any damage caused to retained features or works by the erection or connection of support systems. Agree the methods of repair with the Client's Representative.

056 Check support systems at agreed stages during erection for compliance with design proposals.

**Unknown hazards**

057 Inform the Client's Representative of any unrecorded voids, flues, services, etc., discovered during the erection of support systems. Agree with the Client's Representative methods for infill, making good, relocation of support connections, etc.

**Loading support systems**

058 Complete the erection and connection of the support systems before starting the demolition of any adjoining structures.

059 Inform the Client's Representative when support systems are erected and all connections are made to the structure to be kept in place. Obtain any required permissions to load systems.

**Maintaining support systems**

060 Provide safe access and safe places of work in the support systems for inspection and maintenance.

061 Regularly inspect and maintain support systems, making good ties, wedges, connections, corrosion protection, etc., as necessary.

062 Adequately protect support systems from impact by vehicles, plant and site operations. Prevent access by unauthorised persons. Leave safe when not working at the Properties and outside the Service Provider's Working Hours.

**Dismantling support systems**

063 Inform the Client's Representative when all permanent connections between the supported structure and new construction have been made. Obtain permission before disconnecting and dismantling support systems.

**Making good**

064 Repair any connection holes made in the structure kept in place, using Materials to match those existing. Repair damage caused to buildings, roads or pavements.

**Site clearance**

065 Clear away all debris, excess materials and temporary Works and leave the Property and its site in a tidy condition on completion of the Works.

**DRAINAGE**

**DRAINAGE**

**MATERIALS**

**Vitrified clayware traps and gullies etc**

001 Ensure grating, sealing plates and other metal accessories used are cast iron.

**Granular beddings**

002 Ensure granular bedding for pipes is Type 'A' granular material consisting of broken stone or gravel single size or graded for pipes up to and including 300mm diameter.

**Bricks for manholes etc**

003 Ensure bricks for manholes are Class B clay engineering bricks conforming to BS 3921.

**Step irons**

004 Use general purpose pattern manhole step irons.

**WORKMANSHIP**

**Setting out**

005 Set out all drains as Instructed by the Client's Representative and provide all profiles, etc., necessary for the execution of the Works.

**Existing drains**

006 Check the invert levels of existing drains, sewers and manholes before laying new drains. Notify the Client's Representative immediately if the declared invert levels are found to be inaccurate.

007 Before commencing excavation to expose existing drains, determine the exact line and level of the drain by excavating trial holes by hand. In any case carry out the final 300mm of excavation to expose the pipe by hand to ensure that adjacent lengths of pipe are not damaged by Equipment.

**Excavation**

008 Thin the bottoms of all excavations and consolidate to the correct levels. Fill unauthorised excavations below the required levels with Materials of the same composition as for drain beds. Where the bottom is insufficiently firm, excavate until, in the Client's Representative's opinion, a firm bottom is obtained. Make up the level with Materials of the same composition as for drain beds or with a layer of concrete blinding if so Instructed by the Client's Representative. Agree the particulars of such additional Works with the Client's Representative before covering up the Works, otherwise no payment is to be made for it.

**Planking and strutting**

009 Take care not to undermine the foundations of buildings. If so instructed by the Client's Representative, plank and strut or adopt other means to protect the foundations.

**Backfilling**

010 First fill trenches for clay or cast iron rigid joint pipes to a depth of 300mm with selected fine material carefully hand packed around the pipe. Ensure no materials are tipped into the trench until the first 300mm has been completed.

011 Continue filling in layers not exceeding 300mm thick, well rammed and, if necessary, watered. Do not use mechanical rammers until at least 300mm of consolidated filling has been returned over the pipe.

012 Make good any subsidence causing damage in surfaces or to adjoining structures that occurs after backfilling.

013 Rectify all damage caused to pipework during backfilling.

**Concrete beds, haunching and surround to drain pipes with rigid joints**

014 Ensure beds are;
- a minimum of 150mm thick below the pipes;

015 After testing, haunch up the drains on both sides in similar concrete to half the diameter of the pipe. Where so instructed entirely surround vertical clayware drains and other drains with concrete 150mm thick. Set all gullies, shoes, etc., on a base of similar concrete 150mm thick and the sides encased in concrete 150mm thick.

016 Provide flexible cleavage planes at each joint by means of 25mm thick bitumen impregnated fibreboard through the entire concrete surround.

**Concrete beds and surrounds to clay and PVCu drain pipes with flexible joints**

017 Ensure concrete beds and surround to drain pipes with flexible joints are as described in this specification.

**Granular beds and surrounds to drain pipes with flexible joints**

018 Dig out hard obstructions and soft pockets and remove the excavated materials. Fill the resultant void with granular bedding and consolidate it. Lay 75mm concrete blinding where trenches are in made up ground, or wet conditions are encountered.

019 Ensure drains specified to be "bedded and surround in granular material" are laid on a bed of granular material 100mm deep (150mm deep where concrete blinding is required), spread and compacted and finished to the correct gradients and to the correct widths as Instructed by the Client's Representative. When compacted, form socket holes in the bedding material sufficient to allow the full length of pipe barrels only to rest on them.

020 After bedding, aligning, levelling and testing the drain pipes, place further granular bedding evenly and consecutively on each side to half way up the pipe. Then protect the pipe by a layer of similar granular bedding carefully consolidated by hand to 100mm above the top of the pipe for the full width of the trench.

021 Ensure backfilling for the first section of the trench is from the top of the granular bedding to 300mm above the top of the pipe with an "earth blanket" of selected fine excavated material, sieved through a fine mesh and free from hard pieces of material, building rubbish, frozen soil, tree roots, vegetable matter and any material liable to decay.

022 Ensure backfilling for the next 300mm is with normal excavated Materials as described under the "Backfilling" Paragraph, and carried out by hand with no mechanical ramming.

023 Ensure backfilling for the next 300mm after that is with normal excavated Materials as described under the "Backfilling" Paragraph, and carried out by hand and/or light mechanical ramming.

**Laying drains**

024 Lay drains in straight lines to an even gradient from point to point, each pipe being "boned in" and the whole accurately laid and butted closely together at the joints.

025 Set drain pipes passing through foundations so that a flexible drain joint is not more than 150mm from the face of the wall foundations or manholes with a further joint 600mm from the last joint.

026 Commence drains at the lowest point with sockets leading up the gradient.

027 Rest pipes on solid and even foundations for the full length of the barrel with hollows formed in the granular bed or ground for the sockets.

028 Leave trenches open for inspection by the Client's Representative until the drains have been tested and approved.

**Gullies etc**

029 Set gullies, etc., on concrete seatings, surrounded with concrete and jointed together and to pipes with gaskin and cement and sand mortar or with flexible coupling.

**Brickwork in manholes**

030 Bed brickwork in manholes in cement mortar (1:3) in an appropriate bond, built fair face with flush joints internally. Where built into manhole walls ensure pipes of 225mm diameter and over have half brick relieving arches over.

**PVCu inspection chambers**

031 Ensure PVCu inspection chambers including all fittings, covers and frames etc., have polypropylene shallow universal chambers.

**Benching**

032 Ensure benching in bottoms of brick manholes is in fine concrete to falls of at least 45 degrees to channels finished with cement and washed sand mortar (1:2) 25mm thick, trowelled hard and smooth with all angles rounded.

**Bedding and sealing covers and frames**

033 Bed frames to manhole covers in cement mortar (1:3) and the covers in grease and sand.

**CCTV inspection of drains**

034 Carry out and record an internal inspection with CCTV equipment when Instructed to do so.

035 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 the results.

036 Maintain adequate intensity of illumination within the pipe(s). Provide continual position recording, still photographs and the ability to stop the movement of the camera at any point requested by the Client's Representative.

037 Provide a copy of the recording to the Client.

038 Obtain Instructions from the Client's Representative on remedying any blockages or problems which may be revealed.

**Testing**

039 Test drains and manholes for watertightness and straightness to the satisfaction and in the presence of the Client's Representative and the Sewage Utility Provider. Fill drains with water to a head of 1.5 metres and test them in sections agreed with the Client's Representative:

- after jointing;
- after haunching or bedding and backfilling; and
- after completion of the Works.

040 Provide all necessary testing apparatus and carry out any other tests required by the Client's Representative and the Sewage Utility Provider.

**Clean and flush all drains**

041 Core, clean and flush drains, gullies, manholes, etc. on completion of the Works.

**CONCRETE WORK**

## CONCRETE WORK

### MATERIALS

#### Cement

001 Use ordinary "Portland" cement in accordance with BS EN 197-1:2011, delivered to the Property or site in sound condition. Store and protect it from deterioration due to moisture or other causes.

002 Use cement fresh in the order of its delivery to site. Remove from site any cement which has become caked or otherwise adversely affected.

003 Keep sufficient cement available in store to ensure that concrete work on any section can proceed without interruption.

#### Aggregates

004 For fine aggregate use only well graded coarse river sand of Grading Zones 1-3, clean natural sand or crushed stones.

005 For coarse aggregate use only natural gravel, crushed gravel, or crushed stone, well graded and of the nominal sizes as specified below.

006 Submit samples of aggregates proposed to be used to the Client's Representative for Approval. Ensure all subsequent deliveries conform to the Approved samples. Arrange for ample supplies to be available of both fine and coarse aggregates of the quality and colour selected.

007 Wash fine and coarse aggregates and store them on a hard, clean base where they will not become dirty or otherwise contaminated. Ensure when they are handled that they remain clean and well graded and keep them separate from each other until placed in the mixer.

#### Water

008 When mixing concrete use only clean and fresh water from the main that is not below $4^0$ Centigrade at the time of use.

009 Ensure water does not contain any matter injurious to concrete.

#### Rejected materials

010 Reject and remove immediately from the Property any Materials which have been damaged, contaminated or have deteriorated or do not comply fully with this Specification.

## WORKMANSHIP

### Concrete mixes

011 Ensure concrete mixes comply with the following:

| Mix reference | Equivalent BS 5328 grade | Total dry aggregate weight for use with 50Kg of cement (Kg) | Maximum size aggregate (mm) | Slump range (mm) |
|---|---|---|---|---|
| 7N/20mm | C7.5P | 450 | 20 | 25-75 |
| 20N/20mm | C20P | 300 | 20 | 25-75 |

### Concrete mixing

012 Batch and mix all concrete stronger than 15N/mm2 by weight; measure water by volume or weight.

013 Small quantities of concrete 15N/mm2 and under may be batched and mixed by volume. Measure proportions into gauge boxes. Completely fill and empty boxes at each batching.

014 Carry out mixing in an efficient mechanical batch mixer. Mix each batch for a minimum of one and a half minutes after all the Materials are in the mixer and until the mix is an even colour and consistency throughout. Use the minimum quantity of water consistent with workability and vary it as required to suit the moisture content of the aggregate.

015 Ensure concrete is of such consistency as to produce a slump of not more than 50mm for footings, beds and slabs or 75mm for beams and columns by the slump cone test.

016 Discharge the entire contents of the mixer each time direct into the vehicle used for distributing the concrete before any further Materials are placed in the mixer.

017 Thoroughly clean and wash out mixing machines, mixing platforms, wheelbarrows and any other vehicles or implements used in concreting whenever their use is discontinued for longer than thirty minutes.

### Transporting concrete

018 Transport concrete from the place of mixing to its place of final deposit as rapidly as practicable and by a means which will prevent segregation, or loss of, or addition to the ingredients. Deposit it as near as practicable to its final position so as to avoid re-handling or discharging through chutes or troughs. Ensure all skips, vehicles or containers used for transporting the concrete are thoroughly clean.

### Placing concrete

019 Wherever possible deposit concrete in its final position immediately after mixing. Carefully place it in position and do not tip it from a height exceeding 1.25 metres. Do not re-temper partially set concrete.

020 Deposit concrete in layers not exceeding 230mm thick. Thoroughly tamp it to exclude any voids. In reinforced work carefully pack it around the reinforcement and against the forms to ensure good surfaces that are free from "honeycombing". Take care not to displace the reinforcement from its correct position during concreting.

### Ready mixed concrete

021 Use ready mixed concrete only with the written Approval of the Client's Representative. Where its use is Approved by the Client's Representative, ensure:

- ready mixed concrete is supplied from depots holding a current certificate under the Quality Scheme for Ready Mixed Concrete; and
- the delivered concrete is at a temperature of between $7^0$ Centigrade and $30^0$ Centigrade.

022 Ensure the actual batched weights of cement and coarse and fine aggregate are declared on each delivery ticket from the supplier.

**Construction joints**

023 As far as possible complete each section of the Works in one operation. Where necessary to join up with Works which have been stopped, hack and rough the surface and thoroughly clean and coat it with cement slurry (1:1) before concreting is resumed.

**Work in cold weather**

024 Do not concrete when the air temperature is below $4^0$C. Bear the entire risk of concreting done below this temperature.

025 Take adequate precautions to protect concrete from freezing. Bear all risks of damage to concrete from frost action.

026 Keep a reliable maximum and minimum thermometer at the site of any concreting Works.

027 Pretreat water and/or aggregate where necessary to ensure a temperature of $5^0$ Centigrade in the concrete at the time of placing. Take all necessary precautions to maintain the concrete at or above this temperature until it is thoroughly hardened.

028 Do not use frozen materials. Ensure all Equipment, formwork, reinforcement and concrete at construction joints is free from frost.

029 Follow the guidance on suitable precautions at “Winter Concreting" (Cement and Concrete Association) and "Winter Building" (HMSO).

**Protection and curing**

030 Do not deposit concrete when the temperature is at or below $5^0$ Centigrade except when specially approved precautions have been taken. Properly protect all newly placed concrete during frosty weather.

031 Ensure that concrete is not jarred, walked on or otherwise disturbed during setting.

032 Keep concrete thoroughly damp for at least seven calendar days after concreting and take special precautions to prevent it drying out too quickly.

033 Carry out and replace any concrete damaged whilst setting.

**Traffic and loading on concrete**

034 Ensure there is no traffic over, or loading on, concrete for at least seven calendar days after placing.

**Surface finishes**

035 Place concrete so that the face is free from voids and shows a uniform distribution of aggregate and uniform texture.

036 Use wrot formwork where a fair finish is required to the concrete surface. After removing the formwork, remove the feathers caused by the joints in the boards. Fill any holes or honeycombing which may have formed in the surface by first drenching with water and then filling the void with cement mortar composed of cement and washed sand in the same ratio as that in the concrete mix.

037 Use surface lined formwork where a perfect finish is required to the concrete. Immediately after removing the forms bring the concrete to a true, smooth and even surface, free from board marks, honeycombing, etc., by rubbing down with carborundum stone dipped in cement grout.

038 When no specific finish is required, tamp upper surfaces to a plain or evenly ribbed finish with tolerances suitable for subsequent Works. When a floated finish is specified, close the surface to produce an even slightly coarse texture free from ridges and depressions.

039 Trowel concrete to receive a thin floor covering by power float or other suitable method to produce a dense very smooth surface that is visually flat and suited to the direct application of thin floor coverings. Ensure there are no Defects in the finished concrete that show through the floor.

040 The maximum permissible deviation from flat is 3mm from a 3.00m straight edge.

**Holes, chases, fixing blocks, etc**

041 Incorporate any conduit, pipes, fixing blocks, chases, etc., in concrete members as required. Submit full details of these to the Client's Representative for approval before the Works start. Ensure all fixing blocks, bolts, chases, holes, etc., left in the concrete are:
- of the sizes required; and
- accurately set out and cast with the concrete or boxed out as the Works proceed.

042 Do not cut holes or chases in the concrete unless the Client's Representative Instructs this to be done.

**Reinforcement generally**

043 For bar reinforcement use hot rolled high tensile deformed bars or mild steel round bars.

044 For fabric reinforcement use hard-drawn, steelwire fabric.

045 Ensure all reinforcement is free from pitting due to corrosion, loose rust, mill scale, paint, oil, grease, ice or other material which may, in the Client's Representative's opinion:
- impair the bond between the concrete and the reinforcement; or
- cause corrosion of the steel or disintegration of the concrete.

**Bending reinforcement**

046 Bend or straighten bars cold, gradually and evenly and in a manner that will not injure the Material.

047 Bend steel to the shape exactly as shown on the drawings. Ensure all bends have an internal radius of at least twice the diameter of the bar.

**Placing reinforcement**

048 Place reinforcement exactly as shown on drawings provided by the Client's Representative and use the correct concrete cover. Adequately support and bind the reinforcement at intersections with No. 16 BSW gauge soft pliable mild steel wire so that displacement does not occur when the concrete is deposited. Ensure the lap:
- is at least 40 times the diameter of the bar size; and
- to the mesh is at least 450mm.

**Formwork**

049 Use any suitable Material for formwork. Ensure it is true to line and level, strong and well braced to carry the wet concrete without deformation or deflection, and with closed joints to prevent the loss of concrete. Provide holes for cleaning out rubbish where necessary.

050 Remove all rubbish from the interior of the forms. Clean thoroughly and wet any shuttering in contact

with the concrete before that concrete is placed. Thoroughly clean all forms before re-use.

051 Ensure the safe removal of the whole or part of the formwork.

**Precast concrete**

052 Ensure precast concrete is of the mixes specified.

053 Ensure reinforcement is 25mm clear of the soffit of lintels, steps, etc. Hook the ends of bars for a distance of 38mm and crank to resist shear. Mark the tops of members at the time of casting.

054 Reinforce precast concrete not described as reinforced as necessary to withstand handling and temperature stresses.

055 Adequately cure precast concrete before it is handled and fixed in position.

056 Rub down the surfaces of precast concrete described as "finished fair." Neatly stop any holes, etc. Leave the surfaces perfectly smooth with no sharp arrises. Leave remaining faces rough for plastering or rendering unless stated otherwise in the relevant part of this Specification.

**Bituminous damp-proof membrane**

057 Thoroughly clean the surfaces to receive the bituminous membrane. Apply this strictly in accordance with the manufacturer's instructions.

**Polythene damp-proof membrane**

058 Use heavyweight building sheet for any polythene damp-proof membrane. Lap all joints and make them with double welt folds. Tape all in accordance with the manufacturer's instructions.

059 Take special care to prevent joints unsealing and to avoid puncturing the sheeting during placing operations, subsequently during the laying of the brickwork or securing fixing grounds. Remove and replace any damaged sheeting.

060 Seal any holes through the damp-proof membrane for services by wrapping the pipes in small sheets and using sealing tape around the pipes and main film barrier.

**WOODWORK**

## WOODWORK

### MATERIALS

#### Timber

001 Use only suitable, sound, well conditioned, properly seasoned timber that is free from any defects making it unsuitable for its intended purpose.

002 For carcassing work use '5th Carcassing Constructional Quality' European Redwood, Canadian Hemlock, Canadian Spruce or Western Hemlock softwoods.

003 Use Class 2 European or Douglas Fir for softwood for joinery Works.

004 Level and pack all structural timber.

005 Where hardwood is specified, use any hardwood suitable for the purpose (except as set out in Paragraph 12).

006 Do not use any unreplenishable tropical hardwoods.

007 Well season all timber.

008 Ensure the moisture content in:
- internal joinery is no more than 12% (8% if the Property is central heated); and
- external joinery is no more than 18%.

#### Priming

009 Prime timber in accordance with the finish coat specification. Use a primer recommended by the manufacturer of the surface coating.

#### Preservative treatment of timber

010 Treat softwood described as "treated" or "impregnated" before delivery to the Property with either:
- an appropriate preservative under vacuum-pressure with an average net retention of at least 4kg of dry salts per cubic metre; or
- an organic solvent type preservative giving an overall retention of 16Kg of solution per cubic metre of timber

011 Cut timbers to their final dimensions before impregnation. Where this is not possible, liberally swab any sawn or cut faces or borings with an appropriate preservative from the impregnation plants.

012 After treatment, carefully open-stack the timber in a well ventilated covered space to enable surplus solvent in the preservative to dry out by evaporation. Ensure all treated timber is dry before incorporation in the Works.

013 Allow items of carpentry timber treated with an appropriate preservative a minimum of 3 weeks air drying period following treatment and before fixing. Allow joinery timbers similarly treated a minimum of 6 weeks air drying following treatment and before fixing.

014 Provide a copy of the relevant Preservation Treatment Certificate to the Client's Representative.

**Chipboard flooring**

015 For chipboard flooring, use the appropriate waterproof moisture resistant grade suitable for the purpose.

**Hardboard**

016 Ensure hardboard used to form bath panels has an enamelled surface.

**Plywood, blockboard, particleboard**

017 Ensure all:
- blockboard and laminboard used is five-ply;
- ordinary plywood is weather and boilproof durability ("WBP"); and
- veneer is of the specified species of timber (but where none is specified, it is an appropriate species of timber).

N**ails, bolts etc**

018 Use bolts that are cup square with large washers and nuts.

019 Use sheradised nails for fixing joinery having an external exposed face in accordance with BS 1202: Part 1: 2002, punched in below the surface and filled with approved filler.

**Adhesives**

020 Ensure adhesives for:
- exterior use are synthetic resin type WBP; and
- interior use are synthetic resin type of moisture resistant durability ("MR").

**Timber fillers for rotted woods**

021 Ensure timber fillers for rotted softwoods and hardwoods are a complete system appropriate for the type of wood.

**Storage of material**

022 Protect joinery from the weather during transit. At all times before fixing, both before and after priming, store it under cover and clear of the ground.

**Door frames and linings**

023 Ensure external door frames without cills have 12.5mm diameter x 100mm long galvanised steel dowels housed into the bottom of each leg leaving 50mm projecting. Ensure the frames for fire resisting doors are of a type Approved by the Client's Representative. Ensure frames for half hour doors have 25mm minimum stops.

**Flush doors**

024 Ensure internal flush doors consist of a skeleton or honeycomb core, lipped on two stiles with hardwood strips.

025 Ensure external flush doors are faced on both sides with 6mm external quality resin bonded plywood, for painting or staining to BS 6952 on a solid core. Provide glazing apertures with a rebated, sunk and rounded Utile cover mould and Utile hardwood glazing beads with mitred angles. Ensure the glazing coverpiece and beads are no less than that required by the relevant European or British Standard for glazed apertures.

**Half-glazed flush doors**

026 Ensure the opening for glass in doors described as half-glazed:
- extends the full width between stiles; and
- is at least 680mm high.
-

027 Ensure:
- glazing apertures are provided with a rebated, sunk and rounded Utile cover mould and Utile hardwood glazing beads with angles mitred; and
- the glazing coverpiece and beads are no less than that required by the relevant European or British Standard for glazed apertures.

**Windows**

028 Provide timber windows with a 30 (thirty) year guarantee. Ensure steel windows are galvanised. Provide timber surrounds for steel windows as Approved by the Client's Representative.

**PVCu doors and windows**

029 Ensure all PVCu windows and doors are:
- constructed from high impact modified PVCu; and
- manufactured from base materials guaranteed against decomposition and for colour fastness for a minimum of 10 (ten) years.

030 Guarantee the fabrication of all PVCu frames and sashes against failure of welds, mechanical joints etc., for a minimum of 10 (ten) years.

031 Guarantee double glazed units against failure of the unit for a minimum of 5 (five) years.

032 Guarantee mechanisms against failure of the unit for a minimum of 5 (five) years.

033 Protect PVCu items against damage during the course of fixing.

034 Ensure windows provided can be opened to allow a secure trickle ventilation.

035 Ensure the accurate measurement of the Works and correct any measurement errors.

036 Ensure all window frames show a 65mm face on the outside of the frame.

037 Construct doors from a profile with a minimum of 100mm width showing face.

038 Use only PVCu windows/doors Approved by the Client's Representative unless specified on the Order.

**Sealant**

039 For pointing around window and door frames use sealants:
- Approved by the Client's Representative; and
- that are suitable for sealing to timber, aluminium and PVCu windows and doors, as applicable.

**Combustion air grilles**

040 When repairing or renewing items which incorporate combustion air grilles:
- use either the salvaged air grille (if it is in sound condition) or combustion air grilles as Approved by the Client's Representative; and
- ensure apertures are maintained in the repair or renewed items.

**Fibre cement insulating board**

041 Use insulating board that is asbestos free and has a sanded finish.

**Boards and panels**

042 Do not use cross joints in board coverings.

**PVCu fascias/soffits/cladding and components**

043 Ensure PVCu fascias, soffits, cladding and components are:
- cellular PVCu with a low density (closed cell) core and homogeneous skin;
- with self coloured, smooth, semi-matt finish;
- of sections and profiles Approved by the Client's Representative.

**Plugging**

044 Note that in this Section 'plug', 'plugged' or 'plugging':
- means fix to concrete, brickwork or blockwork and similar surfaces;
- includes supplying and fixing with proprietary fixings; and
- includes shot fired fixing, which is to be used only when Approved by the Client's Representative.

**Architraves, reveal linings, window boards and mouldings**

045 Ensure replacement items match the existing (which may be of varying profiles and shapes). Where painted softwood skirtings and architraves are specified, at the Service Provider's option use an approved MDF equivalent where Approved by the Client's Representative.

**Polythene vapour barrier**

046 For a polythene vapour barrier use a type of sheet Approved by the Client's Representative and fixed with all joints lapped and made with double folds and taped.

**Ironmongery**

047 Carefully wrap and protect ironmongery until completion of the Works. Either replace with new or re-lacquer any defaced or damaged ironmongery as Instructed by the Client's Representative.

048 Use screws of a suitable gauge and Material for the purpose and to match the article to be fixed.

049 Lubricate locks, etc., with graphite and leave them in perfect working order on completion of the Works. Properly label and deliver up all keys to or as Instructed by the Client's Representative.

050 Use black japanned tee hinges and Suffolk latches.

051 Ensure that letter plates comply with the Royal Mail's minimum size standards. Ensure letter plates provided in fire doors conform to the fire rating of the door.

052 Unless the SOW states otherwise provide all ironmongery to new, renewed or replacement timber doors in accordance with the following:
- for internal doors:
  - 1 pair 75mm medium duty steel butt hinges (1½ pair heavy duty hinges for firecheck doors);
  - 1 No. 65 or 75mm tubular mortice latch and keep;
  - 1 set lever furniture/handles; and

- intumescent seals (fire doors only);

- for bathroom/wc doors:
  - 1 pair 75mm medium duty steel butt hinges (1½ pair heavy duty hinges for firecheck doors);
  - 1 No. 65 or 75mm mortice bathroom lock/latch and keep;
  - 1 set lever bathroom furniture/handles with snib/indicator;
  - intumescent seals (fire doors only); and

053 Ensure all door furniture is SAA or brass finished as approved by the Client's Representative or as specified on the Order.

**Kitchen units/worktops**

054 Ensure kitchen units are manufactured to meet strength specification level 'H' and have fully repairable carcassing.

055 Ensure metal fittings and screws used in manufacture are plated against corrosion. Use metal corner gussets as fixing posts.

056 Take all necessary precautions to protect units and worktops from damage. Either make good any damage caused or replace Materials as Instructed by the Client's Representative. Ensure that, when fitted, all doors and drawers operate smoothly.

057 Where existing fixing holes cannot be used for hinges, use a steel cabinet strengthening plate, fixed four times to the unit and hinges fixed with self tapping screws to the plate.

**WORKMANSHIP**

**Generally**

058 Ensure carpentry work is framed and put together in a substantial and workmanlike manner.

059 Ensure joinery work is accurately set out, framed and executed in accordance with detailed drawings and finished off in a workmanlike manner.

060 Put together purpose made doors and other framed work immediately upon the general work being commenced, but do not glue and wedge them until the joinery is prepared in readiness for immediate fixing.

061 Finish off machine planing and moulding smooth by hand.

062 Ensure exposed faces of joinery are wrought and all arrises slightly rounded.

063 Punch and putt nails and pins in exposed work.

**Softwood flooring/board flooring**

064 Renew floorboards carefully so as to avoid damaging the ceiling below the floor. Remove tongued and grooved boards by carefully sawing through the tongues and forming a heading joint adjacent to a joist. When replacing the boards, provide additional support at the heading joint using timber 50 x 25mm secured to the joist.

065 Where a number of floorboards require renewal, well cramp up the new boards to form tight joints and nail them up with two lost head nails punched and putted per board, per joint. Fix access traps with screws. Take care when fixing the floorboards not to puncture or damage any existing services.

066 Provide all additional support battens, noggins etc., required to support the boards.

**Timber door frames and door linings**

067 For new door frames and linings, use a minimum of three sets of fixings to each leg, each set comprising two fixings (either timber plugs and nails or proprietary plastic plugs and screws as appropriate to the quality of the fixing background). Where external door frames do not have timber cills, provide galvanised steel dowels in the legs, grouted into the building structure with cement mortar (1:3).

068 Fix existing door frames or linings which have become loose through the frame using proprietary sleeved screw fixing devices Approved by the Client's Representative.

069 Sink the heads of fixings below the surface of the frame and the recess and fill them with an approved filler.

**Window/door replacement**

070 Undertake window/door replacements that involve removal of the primary frame from the building and associated glazing in accordance with the current Building Regulations Approved Document L using FENSA (or European equivalent) registered firms or Staff.

**Sealant**

071 Before pointing around existing window and door frames, pick out all loose materials and insert a cellular backing appropriate to the type of sealant in the joint between the frame and wall. Use a sealant as specified, inserted by pressure gun to form a neat uniform beaded finish.

**Stud partitions**

072 For stud partitions use suitably sized softwood head and sole plates with studs at 400mm centres horizontally and noggins at 1200mm centres vertically. Butt joint quilts and fill the entire void.

**Kitchen units**

073 Fix base units with proprietary metal or plastic fixing brackets, plastic plugs and screws and the joint between the worktop and wall pointed with a neat bead of anti-mould white silicone sealant.

074 Fix wall units with proprietary metal or plastic fixing brackets, plastic plugs and screws and also support them on full length softwood cleats.

**Worktops**

075 Fix worktops to base units on metal or plastic brackets with self tapping screws. Support worktops with a void under by 50 x 25mm softwood cleats securely fixed to any background on at least three sides. If this cannot be achieved, support the sides affected on a flanged tubular steel support fixed to the floor with proprietary plastic plugs and screws and to the worktop with appropriate self tapping screws. Seal/treat all cut edges to prevent the ingress of moisture.

**Fixing PVCu doors and windows**

076 Take out the existing door/window and hack off render/plaster as far as necessary to accommodate the window fixing cramps in window reveals. Supply and install support lintels over the new window/door opening. Where the original brickwork is carried over the window/door i.e. soldier course, make good the brickwork as necessary. Remove all rubbish and leave the window/door opening ready to receive the new window/door.

077 Fix the PVCu double glazed window/door with or without a cill directly into the prepared brick reveals using galvanised twist-in-lugs Approved by the Client's Representative, screwed to the reveals using galvanised screws. Seal the windows to the masonry openings with silicone sealant Approved by the Client's Representative. Protect the windows during the course of the Works. Wherever possible, fix all windows/doors 35mm set back from the outside face of the brickwork. Remove all old mastic from the

brick face.

078 Where appropriate supply and fix an approved PVCu cellular core window board, fixed with screw on lugs, fixed to the wall, together with 19mm PVCu quadrant beading, glued to the window boards and window frame using an appropriate adhesive.

**PLASTERWORK AND OTHER FLOOR, WALL AND CEILING FINISHES**

## PLASTERWORK AND OTHER FLOOR, WALL AND CEILING FINISHES

### MATERIALS

#### Cement and water

001 Use cement and water as described in the "Concrete Work" Section.

#### Building paper

002 Use building paper of the grade appropriate for its permanent use.

#### Membranes

003 For polythene membranes, use 1000 gauge.

#### Anti slip materials

004 For anti-slip surfaces, use coarse carborundum grains or Chromite grains (grading 12/24).

#### Surface hardener

005 For surface hardener, use a sodium silicate solution of an appropriate grade for the use.

#### Plaster

006 For plaster, use Gypsum building plasters or 'Pre-mixed Lightweight Plaster'.

#### Bonding agent

007 Where bonding agents are permitted, use an EVA (not PVA) adhesive Approved by the Client's Representative.

#### Metal lathing, beads and stops

008 Ensure steel lathing is of the plain expanded type having a minimum weight of 1.6Kg/m2 and coated with a black bitumen solution.

009 Ensure beads and stops are of an appropriate profile and:
- for internal use are galvanised; and
- for external use are manufactured from stainless steel.

#### Plasterboard

010 Fix plasterboard to soffits or studding with 32mm x 12 swg galvanised clout headed nails for 10mm lath and 38mm x 12 swg galvanised clout headed nails for 13mm lath.

#### Thermal board

011 Ensure thermal board is of the thickness specified.

#### Wall tiling

012 Use cushion edge white or coloured glazed ceramic tiles for wall tiling. Use only waterproof adhesives for ceramic tiles.

**Sealant**

013 Use gun grade white silicone anti-mould sealant.

**Floor coverings**

014 Ensure quarry tiles either colour match the existing tiles or are of a colour Approved by the Client's Representative.

**Textured decorative finish**

015 Use a plastic compound textured decorative finish Approved by the Client's Representative. Apply it to provide a finish to match the existing finish.

**WORKMANSHIP**

**Steel lathing beads and stops**

016 Securely fix lathing to:
- timber backgrounds with galvanised staples; or
- steelwork with 1.2mm galvanised tie wire.

017 Ensure all joints have a 75mm lap and are wired at centres not exceeding 75mm.

018 Fix beads and stops with rustproof hardened steel pins, not plaster or mortar dabs.

**Plasterboard**

019 Fix plasterboard with appropriate sized galvanised plate nails at intervals suitable for the particular application. Provide all supporting members as necessary for fixing the plasterboard. Do not use cross joints in boards.

020 Flush up the joints between plasterboards and at the junction between walls and soffits with neat board finish plaster. Cover them with 90mm wide jute scrim cloth bedded in neat board finish. Apply a coat of neat board finish plaster at least 5mm thick immediately after the joint application has set but before it dries out.

021 Fix thermal board in dry lining to walls using the plaster pad and dab process with:
- an appropriate multi-purpose adhesive used as the bonding medium to the solid background;
- a secondary nail fixing made into the set dabs; and
- bitumen impregnated fibreboard for alignment pads.

022 Ensure the plaster finish to thermal board consists of two coats of premixed lightweight plaster with vermiculite aggregate of a total thickness of plaster system of at least 13mm as follows:
- the first coat being scratch coat of bonding plaster; followed by
- a coat of appropriate finish plaster trowelled to a smooth finish.

**Plaster on expanded metal lathing**

023 Ensure the plaster finish to metal lathing consists of three coats of premixed lightweight plaster to a total thickness of plaster system of at least 13mm as follows:
- two scratch coats of expanded metal lathing plaster containing expanded perlite and exfoliated vermiculite aggregate together with a rust inhibitor; followed by
- a finishing coat containing exfoliated vermiculite aggregate trowelled to a smooth finish.

**Plaster on concrete soffits**

024 Ensure the plaster finish to concrete soffits consists of two coats of premixed lightweight plaster, containing exfoliated vermiculite aggregate, to a total thickness of plaster system of at least 10mm as follows:

- the first coat being a bonding scratch coat; followed by
- a finishing coat trowelled to a smooth finish.

**Plaster on solid vertical backgrounds**

025 Ensure the plaster finish to solid vertical backgrounds consists of two coats of lightweight premixed plaster to a total thickness of plaster system of at least 13mm as follows:

- the first coat being:
  - on low suction backgrounds, a bonding plaster scratch coat containing exfoliated vermiculite; or
  - on normal suction backgrounds, a scratch coat of HB browning plaster containing expanded perlite aggregate; and
- the second coat being finish plaster containing exfoliated vermiculite aggregate trowelled to a smooth finish.

**Cement beds, backings and renderings generally**

026 Unless the Client's Representative Instructs otherwise, ensure all beds, backings and renderings are composed of one part Portland Cement to three parts sand, by volume. Keep the water content as low as possible and ensure it does not exceed 18 litres per 50 Kg of cement (including the moisture content in the sand).

027 Brush sub-bases and backgrounds free of all dust. Well wet them and coat them with cement slurry before applying the screeds. Alternatively, use an approved EVA bonding adhesive instead of cement slurry.

028 Where the beds, backings or renderings are specified as waterproof, incorporate an approved waterproofer in the mix.

029 Lay beds in alternative bays not exceeding 3.50m x 3.50m. Finish off the surfaces of beds and backings to receive the appropriate tiling, paving or other finishing.

030 Ensure external renderings have a surface finish to match the existing renderings.

**Wall tiling**

031 Fix tiles to the backing with straight joints on a combed bed of approved waterproof adhesive. Ensure all exposed edges of tiles are round edged. Either round edge or mitre the external angles, at the Service Provider's discretion. Form exposed stop end corners using double bullnose tiles.

032 Fill the joints between tiles solid with an approved waterproof grout. Tool off the joints and clear off all residual adhesive and grout from the tiles and surrounding surfaces on completion of the Works.

**Vinyl and thermoplastic tiles**

033 Unless the Client's Representative Instructs otherwise, lay tiles with straight joints on a combed bed of appropriate adhesive Approved by the Client's Representative. Match the size, colour and pattern of the tiles as nearly as possible to any existing surrounding tiles.

**Quarry tiles**

034 Lay tiles either on a bed of cement and sand (1:3) or on a cementitious adhesive bed Approved by the Client's Representative 3-6mm thick, which makes full contact with the tile and background.

**Textured decorative finish (artex)**

035 Fill joints in plasterboard to receive decorative textured finish with plastic filler. Cover them, while wet, with wet strength paper scrim or while wet or dry, with glass fibre membrane scrim tape. Allow this dry before applying the finishing coat. Apply the finishing coat evenly. Tool or brush this to match the existing surrounding finishes or as the Client's Representative Instructs otherwise.

**Labour and sundry items**

036 Cut and fit and/or make good all wall and floor finishings around any kind of obstruction or projection of a permanent nature from the wall background or floor base including any:

- structural elements;
- pipework, ducting and their brackets and supports;
- fittings and appliances in connection with the electrical, water, gas heating, air conditioning, communication and waste disposal systems; and/or
- fittings and any permanent object in connection with any permanent parts of the Property.

037 Unless the Client's Representative Instructs otherwise, maintain plasterwork, renderings, backings, asphalt and any applied finishes in the same plane as any existing surrounding similar applications. Make a fair joint between the new application and any existing surrounding application.

**PAINTING AND DECORATING**

## PAINTING AND DECORATING

### GENERAL

#### Redecorate/touch up/make good

001 Note that “redecorate/touch up” or “make good decoration” includes preparation, priming, one undercoat and either one gloss coat to previously painted surfaces or reinstating any stain or clear finish for previously stained or clear finish surfaces.

### MATERIALS

#### Generally

002 Obtain undercoats and finishing coats for an individual surface from the same manufacturer.

003 Ensure paints are delivered to the Property in sealed containers as received from the manufacturer and no labels are removed or painted out. Use the paint without adulteration.

004 Under no circumstances thin paint supplied by the manufacturer unless the Client’s Representative Approves this. When such Approval has been granted, carry out thinning with thinners provided by the manufacturer.

005 Execute painting in shades Approved by the Client’s Representative. Submit samples of tints before ordering Materials. Ensure each coat of paint approximates to the finished shade, and where certain tints are recommended by the manufacturer, they are used.

006 Provide samples of Materials to the Client’s Representative for Approval in sample tins filled 7/8 full after the contents of the container or kettle have been thoroughly stirred and mixed. Record all relevant details of the Materials sampled.

007 Immediately remove any unsatisfactory Materials from the Property and make good any Works executed with such defective Materials.

008 Use water based paints where appropriate.

#### Knotting

009 Use a best quality shellac knotting compound, dissolved in methylated spirits. Cover all knots and resinous parts.

#### Stopping

010 Ensure stopping for:

- plasterwork - is a plaster based filler;
- concrete, rendering or brickwork - is of similar material to the background and is finished with a similar texture;
- internal woodwork, hardboard, fireboard and plywood - is putty and is tinted to match the colour of the undercoat;
- external woodwork – is linseed oil putty or another proprietary filler recommended for external use, Approved by the Client’s Representative and tinted to match the colour of the undercoat; and
- clear finished woodwork - is tinted to match the surrounding woodwork.

**Primer for alkaline surfaces**

011 For alkaline surfaces use a special primer obtained from the maker of the undercoat and finishing coat.

**Primer for iron and steelwork**

012 Prime iron and steelwork with a primer recommended for those surfaces by the manufacturer of the subsequent finish coats.

**Primer for galvanised iron and steelwork**

013 Prime galvanised iron and steelwork with a primer that is compatible with the subsequent finish coats. Pretreat new galvanised surfaces with a mordant solution before priming.

**Primer for hardboard**

014 Where hardboard is not factory primed or sealed, use a suitable primer obtained from the maker of the undercoat and finished coat.

**Primer for woodwork**

015 For woodwork, use a finishing ready-mix primer obtained from the maker of the undercoat and finishing coats.

**Primer for oily or resinous timbers**

016 For British Columbia pine (Douglas fir) or other oily or resinous timber, use an aluminium based priming paint not darker than BS 4800 Colour 00A01 Approved by the Client's Representative which is compatible with the subsequent coats and obtained from the same manufacturer.

**Primer for stains**

017 For stain finishes, use a primer recommended by the manufacturer of the respective stain finish.

**Stabilising sealer**

018 Use a type and make of stabilising sealer recommended by the manufacturer of the undercoat and finishing coat.

**Chemical stripper**

019 Ensure chemical paint stripper is water soluble.

**Anti fungal solution**

020 Ensure an anti-fungal solution is appropriate to the surface being treated and is used in accordance with the Pesticides Safety Precautions Scheme (3.2/160).

**PREPARATION OF SURFACES**

**Preparations**

021 Thoroughly prepare all surfaces to a high standard of preparatory work.

022 Report any necessary paint removal to the Client's Representative and agree the extent of this with the Client's Representative before starting this Work. Note that no payment will be made for paint removal unless this is done.

023 Apply a liberal brush coat of water repellent timber preservative conforming to Building Establishment Technical Note No. 24 (or European equivalent) to existing bare non-durable timber surfaces. Allow adequate time for this to dry before over coating.

023 Rub down previously painted surfaces in good condition with abrasive paper. Fill cracks as described. Subject to Paragraph 023, remove existing paint in poor condition completely using a non-caustic paint remover Approved by the Client's Representative.

025 Treat stains on the ceiling before decoration to prevent them bleeding through subsequent decorative coatings.

026 Use tinted undercoats if the Client's Representative so Instructs.

**Approval**

027 Where specified, obtain the Approval of The Client's Representative to the preparation of surfaces before applying any coating.

**Stopping**

028 Where stopping is referred to in this Section, use the appropriate stopping as described in the Materials Section.

**Burning off**

029 Burn off and rub down to remove paint from wooden surfaces. Fill in cracks, knot, prime and stop woodwork so exposed all as described for new work, rub down with fine abrasive paper and apply one additional undercoat before painting as specified.

**Plaster, render, concrete and brickwork**

030 Remove plaster or mortar splashes from the decorated surfaces by scraping. Stop all holes, cracks, etc. Brush down the whole surface to remove dust and loose material. Remove all traces of mould oil by scrubbing with water and detergent and rinsing with clean water to remove all detergent.

031 Allow plaster surfaces to dry out completely before decorating.

032 Remove efflorescence first by wiping dry with a dry course cloth and then with a damp cloth. Leave the surfaces for 48 hours to see if efflorescence has ceased and clean the surfaces to remove dirt, dust, etc.. Allow the surfaces to dry out thoroughly before painting is commenced. When efflorescence has occurred or is suspected, defer painting as Instructed by the Client's Representative.

033 Cut out loose and defective rendering and make good before redecoration. Stabilise existing surfaces to be redecorated with an stabilising agent Approved by the Client's Representative that is compatible with the paint finish.

**Plasterboard to receive direct redecoration**

034 Finish the joints in plasterboard ceilings to receive textured decorative finishings as described in the 'Plasterwork and other floor, wall and ceiling finishes' Section.

**Iron and steel**

035 Remove rust, mill scale, welding slag and flux residue from iron and steel surfaces by wire brushing, scraping, hammering, flame cleaning, etc.

**Previously painted metalwork**

036 Thoroughly clean down all paintwork which is in sound condition and rub down with abrasive paper. Remove small areas of defective paint and all rust and loose scale by chipping, scraping and wire brushing back to clean metal. Prime the metal so exposed immediately after preparation with one coat of primer and apply one additional undercoat before painting.

**Defective putties**

037 Hack out defective, cracked or uneven putties to glazing, prepare and prime the rebates as required and make good the putties before any painting is carried out. Allow putties to form a hard skin before painting.

**Hardboard**

038 Remove dirt and grease from hardboard surfaces. After priming ensure all nail holes and other imperfections are stopped.

**Plywood**

039 Prime surfaces of internal plywood before painting with one coat of primer, filled as required with a plastic based filler. Rub and dust down and apply a second coat of primer.

040 Prime surfaces of external plywood before painting with one coat of primer, filled with a filler tinted to match the colour of the undercoat. Rub and dust down and apply a second coat of primer. After final priming ensure all imperfections are stopped, rubbed down and brushed off.

**Woodwork to be painted**

041 Before fixing woodwork, rub down surfaces that will be visible after fixing. Scorch back excess resin from live knots and resin pockets. Coat all knots and resinous areas with fresh knotting. Prime all surfaces, ensure all nail holes and other imperfections are stopped. Rub down the whole surface and brush off all dust before the undercoat is applied.

**Previously painted woodwork**

042 Wash down thoroughly with sugar soap all paintwork which is in sound condition. Rub down to a smooth surface with an abrasive paper Approved by the Client's Representative. Rinse well with clean water and allow to dry. Fill in cracks, etc., as described for new woodwork.

043 Remove small areas of cracked or defective paint by carefully scraping back to a firm edge. Knot, prime and stop woodwork so exposed as described for new work. Sand with fine abrasive paper and apply one additional undercoat before painting as specified.

044 Apply a liberal coat of brush applied water repellent timber preservative conforming to Building Research Establishment Technical Note No. 24 (or European equivalent) to bare existing non-durable timber surfaces or surfaces with defective areas of paint film. Allow adequate time to dry before overcoating.

**Woodwork to receive a clear finish**

045 Stop holes and other imperfections in surfaces that are to receive a clear finish. Rub down the whole surface and brush off all dust.

046 Prepare existing varnished surfaces in sound condition by cleaning down with an detergent Approved by the Client's Representative and thoroughly rinsing them.

047 Strip and revarnish existing varnished surfaces in unsound condition.

**Woodwork to receive stain finish**

048 Prepare previously treated and untreated surfaces that are to receive a proprietary stain finish in accordance with the manufacturer's instructions.

**WORKMANSHIP**

**Paint**

049 In order to eradicate any unauthorised addition of thinners or driers, or other adulteration of paint:
- give adequate supervision during the painting work to ensure that paint is not adulterated;
- note that if cases of unauthorised or excessive thinning or other adulterations are discovered, the Client's Representative will usually exercise the power contained in this Contract to require the removal of the Staff members concerned;
- ensure a notice is exhibited drawing the attention of Staff to the Client's requirement to use paint as supplied by the manufacturer and the consequences of a breach of this requirement; and
- note that similar requirements will apply to Subcontractors.

**Stirring of Materials**

050 Thoroughly stir the contents of all cans and containers of Materials before and during use. Suitably strain them as and when necessary.

**Brushwork**

051 Apply coatings by brush or roller. Use sprays only with the prior Approval of the Client's Representative.

**Priming of glazing beads**

052 Prime and stain glazing beads, rebates and the backs of beads at the same time as priming and staining the window frames.

**Condition of priming**

053 If the priming has in any way deteriorated or has been damaged by the time of the first undercoat, rub down and reprime the affected portions, or the whole if necessary. Where required, touch up with the same priming paint or equivalent all articles, such as the windows, that were primed by their manufacturers.

**Coatings to be dry**

054 Allow coatings to dry thoroughly for the time specified by the manufacturer before applying succeeding coats.

**Painting windows/doors**

055 Do not paint windows or doors in the closed position.

**Rubbing down**

056 Rub down or denib undercoats for paints and clear finishes to a smooth surface with abrasive paper. Remove all dust before the succeeding coat is applied.

**Differing colours of undercoats**

057 Ensure each succeeding coat of priming and undercoating paint is sufficiently different in colour to be readily distinguishable.

**Unsuitable conditions**

058 Do not apply coating:
- to surfaces affected by wet, damp, foggy or frosty weather or other unsuitable conditions;
- to any damp surface; or
- in temperatures below $5^0$ Centigrade.

**Protection of wet surfaces**

059 Take adequate care to protect surfaces whilst still wet, by the use of screens and 'wet paint' signs where necessary. Take responsibility for any damage which may be caused by or through wet paint.

**Damage to adjoining surfaces**

060 Take care not to damage or stain other Works when storing Materials, preparing surfaces, or applying paint or stains. Remove all such stains, making good the stained surface and touching up any paintwork disturbed.

**Cleanliness**

061 Keep brushes, tools and equipment clean. Keep surfaces clean and free from dust during the painting processes. Do not carry out painting in the vicinity of other operations which might cause dust. Provide a suitable movable receptacle into which all liquids (including slop washings) are placed. Ensure this is not tipped down any of the gullies, manholes, sinks, basins, water closets or any other sanitary fittings. Remove all solid refuse or inflammable residues from the Property.

**Removal of ironmongery**

062 Remove surface fixed ironmongery, fittings and door/window furniture (except hinges) before painting and refix them on completion.

**Radiators**

063 Take down radiators to allow the proper decoration of the surfaces behind. Refit the radiators and refill the systems including inhibitor and balance if required.

**Protection of furniture**

064 Protect all furniture and fittings, use dust sheets and remove items such as curtains before commencing the Works. Rehang or reinstate on completion of the Works.

**GLAZING**

## GLAZING

### MATERIALS

#### Glass

001 Ensure glass is free from all specks, bubbles, bladders and all other defects.

002 For clear float glass, use 'ordinary glazing quality'.

003 For obscure/patterned glass, use clear cast glass either to match the existing glass or of a pattern Approved by the Client's Representative.

004 For polished plate glass, use 'glass for glazing quality'.

005 For wired glass, use Georgian wired cast or Georgian wired polished plate glass, as specified. Ensure the wire extends to the edges of the glass and is free from rust.

#### Double glazed units

006 Ensure flat hermetically sealed double glazing units are manufactured using low-E glass and have a minimum 5 (five) year guarantee. Provide details of the guarantee to the Client's Representative.

#### Putty

007 For glazing to wood, use linseed oil putty or equivalent.

008 For glazing to metal, use metal casement putty.

#### Intumescent mastic

009 Ensure mastic to firedoors is of a type of fire protection sealant Approved by the Client's Representative.

### WORKMANSHIP

#### Glazing generally

010 Undertake all glazing in accordance with the Glass and Glazing Federation Code of Practice and the current Building Regulations Approved Document L as appropriate. Where glazing is associated with window or door replacement involving removal of the primary frame from a Property, ensure the Works are undertaken only by a FENSA (or European equivalent) registered firm of Staff.

011 Accurately cut glass to size with a small clearance.

012 Ensure glass, except that bedded in patent glazing strip, is bedded back and front and around the perimeter with the putty or mastic neatly trimmed and cleaned off.

013 Ensure glazing is sprigged to wood, clipped to metal, or fixed with aluminium, timber beads or PVCu beads and security clips.

014 If gasket glazing is required, ensure the glazing gaskets and weather seals are extruded from EPDM (Ethylene Propylene Diene Monomer).

015 Install obscured glass in single glazing with the "rough" side to the inside of the Property. Install obscure glass to sealed double glazed units with the "rough" side to the inside of the unit and the obscure glass to the inside of the Property.

016 Seal and prime rebates and beads before glass is inserted.

**Double glazing units**

017 Use setting blocks and distance pieces so as to centralise the glass, unit or infill within the opening and ensure that it cannot move in the wind. Use setting blocks at the bottom edge of the frame. For fixed windows, position them as near the quarter points as possible. Where it is necessary to avoid undue deflection of the frame, place them nearer the sides, but never less than 85mm from the corner. Use setting blocks that are 3mm wider than the glass unit or infill and as thick as the designed edge clearance. Allow for toeing and healing.

018 Use setting blocks that are at least 25mm in length and approximately 25mm in length for each metre of major glass dimension. For vertically pivoted windows, use setting chocks that are at least 75mm in length.

019 Use location blocks between the edges of the glass unit or infill and at the top and sides of the frame in an opening light.

020 Use distance pieces 25mm long and 3mm less in height than the rebate depth. Ensure the thickness is at least 3mm and such as to ensure that the glass is held firmly in the glazing rebate. Insert rigid PVC shims if necessary, to ensure that the distance pieces are a tight fit between the face of the glass and rebate. For beads which fit into continuous grooves, insert the first distance pieces 75mm from each corner, and the remainder at approximately 30mm centres. For beads fixed by screws or other studs, insert the distance pieces at the fixing points provided.

**Neoprene glazing gaskets**

021 Fit glass to PVCu windows using glazing gaskets appropriate to the window. Angle all glazing gaskets if possible, but in any event mitre all corners.

**PLUMBING**

## PLUMBING

### GENERAL

#### Generally

001 Ensure all Materials comply with the requirements of the applicable water Utility Provider.

002 Use rust proofed ancillary and fixing Materials. Ensure all Materials in direct or indirect contact are compatible so as to prevent electrolytic or chemical corrosion.

003 Note that the Client's Properties may contain a variety of disposal systems manufactured from conventional materials and also a wide range of manufacturer's proprietary systems.

004 Seal any pipework entering a vertical service duct all round with intumescent sealant to prevent the passage of fire or smoke.

### MATERIALS

#### Plastic soil and vent pipes

005 Ensure the colour and jointing and fixing match the existing pipework unless the Client's Representative Instructs otherwise.

#### Plastic waste pipes, fittings and traps

006 Use "high temperature" plastic waste pipes, fittings and traps. Fully protect any external polypropylene and ABS pipes and fittings from sunlight. Ensure waste pipes, fittings and traps match the existing waste systems unless the Client's Representative Instructs otherwise.

#### Copper waste pipes and fittings

007 Ensure the gauges of pipework and types of fittings match those of the relevant existing pipework.

#### Plastic water supply pipes and fittings

008 Use blue polyethylene pipes with copper fittings for pipework laid underground for potable water supplies.

#### Copper water supply pipes and fittings

009 Use lead free capillary fittings for potable water supplies.

#### Fittings for lead supply pipes

010 Use lead to copper mechanical joint fittings for connecting dissimilar pipes to existing lead water services.

#### Overflow pipes and fittings

011 Ensure the pipework for overflows complies with the same requirements as for water supply pipework.

#### Solder

012 Do not use lead based solders or solders containing lead in Works associated with potable water supplies. Use tin/copper or tin/silver compositions instead.

#### Float valves

013 Use float operated valves unless the Client's Representative Approves the use of piston valves. Where

Approval is given, use piston valves of at least 22mm that comply with the requirements of the Utility Provider.

**Taps**

014 Use chromium plated metal taps. For lavatory basins and sinks, use 1/2 inch taps; for baths, use 3/4 inch, unless the Client's Representative Instructs otherwise.

**WORKMANSHIP**

**Water supply**

015 Support pipework at centres recommended by the manufacturer with approved clips or brackets of a type to suit the background to which it is required to be fixed.

016 Ensure that pipes used in repairs are similar to the existing pipework, but repair lead pipework using appropriate plastic pipe and approved compression fittings. Do not use copper pipework for repairs to lead pipework. Use either compression or lead free solder capillary ring fittings.

**Sanitary fittings**

017 Properly install sanitary fittings. Take care to ensure that integral overflows are not obstructed with jointing compounds.

018 Isolate waste, taps and other fittings from the sanitary fittings with the appropriate flexible washers making an effective seal.

**ELECTRICAL INSTALLATION**

## ELECTRICAL INSTALLATION

### GENERAL

#### Regulations

001 Ensure all electrical Works are carried out in accordance with the current edition (complete with amendments) of the Regulations for Electrical Installations published by the Institution of Electrical Engineers ("the IEE Regulations") applicable at the time the Works are carried out.

#### Equipotential bonding

002 Connect the following to the main earthing terminal using earthing clamps to BS 951 or European equivalent or other means Approved by the Client's Representative where appropriate:
- main cold water pipe adjacent to stop valve;
- main gas pipe adjacent to and on the consumer side of the gas meter;
- central heating system pipework;
- other service pipes and ducting;
- exposed metallic parts of the building structure; and
- lightning conductor.

#### Supplementary bonding

003 Within the zone formed by the main equipotential bonding, provide connections to:
- sinks;
- exposed pipes;
- heating and ventilation systems.

### MATERIALS

#### Earth Electrode

004 Ensure any earth electrodes used are manufactured from copper with hardened steel driving cap, hardened steel tip and phosphor bronze coupling screws. Use sufficient electrodes (in length and number) to give the required earth loop impedance.

005 Protect each earth electrode from mechanical damage by enclosing the earth lead in a heavy duty cast-iron or concrete box with lid. Enclose the entire lengths in heavy gauge, galvanised steel conduit. Attach permanent labels indelibly marked "Safety Electrical Earth Do Not Remove" to the earth lead at both the meter cupboard and at the earth electrode.

#### Conduit/trunking/ducting

006 Do not use surface conduit or trunking without an Instruction to do so from the Client's Representative.

#### PVC conduits and fittings

007 Ensure PVC conduits and fittings comply with the following:
- strength: heavy gauge super high impact;
- shape/colour: round, white or black;
- jointing: push fit and solvent welded;
- fittings: standard;
- mounting/support: screw the conduit to surfaces using the conduit manufacturer's clips/saddles;
- use maximum practical straight lengths to minimise number of joints;
- use proprietary bends and/or junction boxes at changes of direction;
- do not use elbows, tees or site formed bends without the Approval of the Client's Representative;
- secure the conduit system using boxes, plated screws and fibre/plastic plugs;

- fix boxes independently of the conduit; and
- form secure joints, using expansion couplings where recommended by the manufacturer and connectors at equipment and terminal fittings.

**PVC surface cornice trunking system**

008 Use PVC surface cornice trunking in conjunction with mini trunking for the mechanical protection of sub-mains cables and final circuit cables in accessible locations at ceiling level, where Approved by the Client's Representative. Ensure the trunking complies with the following:
- fittings: use the manufacturer's standard fittings;
- colour: white;
- mounting/support: secure to surfaces using plated screws and fibre/plastic plugs; and
- use proprietary units to form junctions and changes of direction wherever possible.

**PVC surface mini-trunking system**

009 Use PVC surface mini-trunking for the mechanical protection of final circuit cables in accessible locations. Ensure the trunking complies with the following:
- fittings: use the manufacturer's standard fittings;
- colour: white;
- mounting/support: secure to surfaces using plated screws and fibre/plastic plugs; and
- use proprietary units to form junctions and changes of direction wherever possible.

**Fire stopping of trunking/ducting**

010 Seal trunking/ducting internally with firmly packed rock fibre or intumescent type material supplied by the trunking/duct manufacturer.

**Cables generally**

011 Ensure cables are BASEC certified. Use cables in the locations and for the uses specified in the table below:

| Location/Use: | Cable Type: |
|---|---|
| General (includes central heating, ventilation and smoke detector systems) | PVC insulated and sheathed |
| Conduit system (complete) | PVC insulated and sheathed or PVC insulated only |
| Sub-mains distribution | PVC split concentric |
| Sub-mains distribution armoured and PVC sheathed | PVC insulated, PVC sheathed, steel wire |
| Fire alarm system | MICC with PVC sheath |

**PVC insulated and sheathed cables and PVC insulated split concentric cables**

012 Colour code cables for identification.

**Electrical accessories generally (wall mounted)**

013 Ensure wall mounted accessories for the connection and control of power, lighting and low voltage equipment are:
- manufactured using white moulded plastic;
- complete with surface or flush type mounting box except where specified otherwise;
- from the same manufacturer in a single installation; and
- marked to show their function where they are a control switch for a immersion heater, a cooker, a refrigerator, a washing machine or a circulating pump.

014 Ensure metal boxes for flush mounting switches and sockets are manufactured from galvanised steel complete with an earth terminal.

015 Fix all boxes using brass screws, fibre or plastic plugs.

**Electrical accessories generally (ceiling mounted)**

016 Ensure ceiling mounted accessories for the connection and control of power, lighting and low voltage equipment:
- are manufactured using white moulded plastic;
- are complete with mounting box where required;
- are from the same manufacturer where used in a single installation;
- are fixed with brass or sheradised screws, with fibre or plastic plugs as required; and
- in conduit systems have a white insulated break-ring between the ceiling roses and cord switches and the respective terminal boxes.

**Consumer unit**

017 Ensure consumer units:
- have a surface insulated pattern enclosure complete with lid;
- have a main switch of 80/100 amp DP rating;
- are fitted with miniature circuit breakers to BS EN 60898 Approved by the Client's Representative; and
- have each way permanently labelled to identify the circuit and rating.

**Residual current device/residual current circuit device (RCD/RCCD)**

018 Ensure RCDs and RCCDs:
- function as both isolators and switches;
- have a current rating of 80 amp DP;
- have a sensitivity of 30m amp; and
- are complete with an insulated cover or terminal shrouds.

**Residual current circuit breaker (RCCB)**

019 Ensure RCCBs:
- function as both isolators and switches;
- have a current rating of 63 amp DP;
- have a sensitivity of 30mA; and
- have a white PVC enclosure.

**Residual current circuit breaker with override protection (RCBO)**

020 Ensure RCBOs:
- function as both isolators and switches;
- have a current rating of 32 amp SP;
- have a sensitivity of 30mA; and
- are complete with an insulated cover or terminal shrouds.

**ISCO connectors**

021 For ISCO connectors ensure:
- the covers and bases are manufactured from black phenolic resin material; and
- the connector blocks are manufactured from brass with electro-tin finish.

**Smoke detectors**

022 Ensure smoke detectors:
- have white PVC for the housing;
- include a photoelectronic sensor;
- are 240 V mains operated with 9 V zinc carbon battery backup; and
- include a full function test switch, automatic reset and low battery warning signal.

**Heat detectors**

023 Ensure heat detectors:
- have white PVC housing;
- comprise a fixed temperature fast response thermistor sensor with a range of $54^{o}$ – $62^{o}$ centigrade;
- are 240V mains operated with 10 year rechargeable lithium cell backup; and
- Include or have a test button and low power cell warning signal with both separate mains and battery warning LEDS.

**Carbon monoxide detectors**

024 Ensure carbon monoxide detectors:
- have white PVC housing;
- incorporate an electrochemical cell sensor module;
- are 240V mains operated;
- include an automatic self diagnosis test/hush buttons;
- have a pre-alarm warning LED;
- include LEDS for power, CO2 level and fault status; and
- have a CO2 gas test feature.

**Fixing electrical accessories/equipment**

025 Position accessories accurately and squarely to the vertical and horizontal axes. Where not shown otherwise, align adjacent accessories on the same vertical or horizontal axis (as appropriate). Agree the mounting heights with the Client's Representative.

**Multi-gang switches**

026 Connect switches so that there is a logical relationship with the lights.

**WORKMANSHIP**

**Installation generally**

027 Install, test and commission the electrical work in accordance with the IEE Regulations and the design and performance requirements set out in this Section so as to provide a safe, well insulated, earth protected system capable of supplying the anticipated maximum demand.

028 Ensure all installation Works are carried out by qualified electricians fully conversant with the IEE Regulations.

029 Do not allow the number of Apprentices and Trainees at a Property to exceed the number of qualified electricians.

030 Ensure all installation Works are carried out under the direct supervision of a "Qualifying Manager" named in the List of Approved Contractors issued by the National Inspection Council for Electrical Installation Contracting (or European equivalent).

031 Use only the types of fastenings, bushes, glands, terminals, connectors, clips, clamps and all other minor accessories necessary to complete the installation that are recommended by the manufacturer of the electrical equipment being installed.

032 Avoid contact between dissimilar metals. Use corrosion resistant fastenings in locations where moisture

is present or may occur.

**Distribution charts - labelling of equipment**

033 Fix circuit charts securely to the inside of each item of distribution equipment, clearly indicating the circuits protected, fuse and MCB ratings and the size and type required.

**Electricity supply**

034 Note that the electricity supply is nominally 240 volt, single phase, 50 hertz, 2 wire.

**System of wiring**

035 For concealed wiring, use PVC sheathed 600/1000 volt grade cable of the size and type specified. Wherever possible, run it in interfloor spaces, roof and ceiling voids.

036 Install the cable:
- with a minimum clearance of 150mm to all heating, gas and waste pipes or ducts; and
- physically separated from other wiring not associated with lighting and power supplies.

037 Ensure cables leaving or crossing joists do so at right angles to the longitudinal side of the joist, on trusses or binders. Do not notch or saw joints. Ensure that cables do not run in positions where they are susceptible to damage by floor nails.

038 Do not run cables in roof spaces on the top of joists or near water tanks, etc., since in this position they are susceptible to damage.

039 Install cables leaving roof voids and interfloor spaces or passing through any part of the structure in conduit or trunking as specified.

040 Ensure cables in solid floor that are either laid in screed or in a ceiling void are drawn in through rigid PVC conduit as specified and run continuously from the consumer unit to the outlet served.

041 Do not install cables within wall cavities.

042 Contain all wiring to each flat within that flat.

043 Fit conduits complete and then draw the cable through.

**Cables installed in plastered walls**

044 Protect cables by rigid PVC metric super high impact heavy gauge conduit where no conduit exists at present. Reuse existing conduit where Approved by the Client's Representative.

045 Ensure new conduits are in continuous lengths, smooth in bore, true in size, and terminating in roof and interfloor spaces with a minimum projection of 50mm. Provide inside outlet boxes with a universal cleat.

046 Ensure new conduits are vertical and chased into the wall, such that the finished wall will provide a minimum of 10mm plaster cover. Adequately fix the conduit with sheradised nails and saddle clips, such that during the plastering processes, there is no tendency for plaster to push the conduit forward and reduce the cover.

047 Where Approved by the Client's Representative, embed cables in plastered surfaces and cover them with 'top hat' trunking secured at a depth to allow the plastered surface to be made good.

**Cables installed in proprietary de-mountable or plasterboard partitions**

048 Install cables in proprietary or de-mountable similar type partitions. Draw them through holes formed by

forcing a suitable rod through the honeycomb core of the partition from above.

049 Take due account of any insulation within the partition when sizing the cables so as to prevent overheating.

050 In plasterboard partitions with a timber core, draw cables through the partition between the timber studding and noggins. Where timber work occurs, take the cable over the face of the timber by a small chase through the plasterboard and into the timber. Make good the chase with a suitable plaster material finished smooth and flush. Ensure cables installed in partitions are vertical.

**Conduit installed on the surface**

051 Allow for the expansion of PVC conduit.

052 Install the conduit only vertically or horizontally.

**Where new cables are to be installed in or under solid floors**

053 Protect cables by rigid PVC round super high impact heavy gauge conduit laid in continuous lengths from the consumer unit to the outlet served, run in a diagonal line. Use the proper outlet and inspection bends and tees. Adequately fix the whole system to avoid any displacement by subsequent building trades.

**Requirements for PVC conduit systems**

054 Install no more cables in each circular conduit than necessary to permit easy insertion and withdrawal. Do not install more than the maximum recommended in the IEE Regulations. Demonstrate to the Client's Representative that cables can be easily withdrawn and inserted in any section of the installation. If this cannot be done using the existing conduit, then provide new conduit.

055 Use conduits, boxes, fittings and accessories from the same manufacturer and with suitable fixings for the application. Ensure circular conduit is at least 20mm in diameter.

056 Ensure PVC outlet boxes and equipment do not become distorted during plastering. Install boxes flush with the finished plaster and the sides vertical, using 1.25" No.8 woodscrews and rawlplugs or equivalent fixing.

**Use of cable trunking**

057 Use cable trunking to improve the appearance at points in the installation where a number of conduits terminate or share a common route, and/or at the meter intake positions for the formation of distribution board/local isolator assemblies. Use compact miniature trunking of the appropriate size.

058 Use PVC trunking with fitted end covers. Provide a separate earth continuity conductor.

059 Connect trunking to equipment by appropriate screwed couplers, bushes and shakeproof washers, or flanged couplings.

060 Connect trunking to PVC conduit by "threaded to plain" adaptors with lock nuts, or clip in adaptors.

061 Clean out trunking before cable is drawn in.

062 Ensure the number of cables installed in trunking does not exceed the space factor specified in the IEE Regulations.

063 Ensure light switches in bathrooms are white plastic 5 amp AC surface pattern operated by a non-conductive pull cord and knob and hang 1300mm above floor level. Fit them close to the wall and well clear of the door to the room.

064 Support ceiling fittings that are wired and located between joists by wooden bearers of a minimum size of 100x25mm fixed to the joists at both ends of the bearer.

**13 amp ring circuit installation**

065 Connect sockets in ring circuits without spurs using cable as specified, with both ends of each circuit terminated in one 32 amp MCB at the consumer distribution unit.

066 If desired, use spurs from ring circuits to the maximum as specified in the current IEE Regulations with due regard to the load or the circuit. Use fused connection units for static items of equipment, provided that not more than one appliance is connected to each ring circuit.

067 Prevent overloading of circuits by providing specified appliances with separate final-circuits.

068 Use junction boxes only with the Approval of the Client's Representative.

069 Locate sockets and fused connector boxes in the same positions as those existing. Ensure they are 13 amp 3 pin white flush pattern. Gang sockets as required, with a multiple plate cover.

070 Use surface pattern sockets protected with a RCCD device in garages, and elsewhere on fair face brickwork.

071 Ensure sockets have switches unless otherwise specified

072 Recess socket boxes into the walls to just below plaster level and provide them with adjustable fixing lugs.

**COMPLETION**

**Inspection and testing**

073 Ensure that on completion and before being energised, any installation is tested in accordance with the IEE Regulations current at the time the Works are undertaken.

074 Give not less than 24 hours notice to the Client's Representative before commencing the testing.

075 After satisfactory completion of tests, submit copies of all inspection and completion certificates, with all associated schedules and test results if applicable, to the Client's Representative.

076 Note the testing instrument serial numbers on the test certificates.

**Report and certificates**

077 Ensure all inspections, reports and test certificates and forms are the current version at the time of the test and are in the standard format published by the National Inspection Council for Electrical Installation Contracting (NICEIC), the Electrical Contracting Association (ECA) or other certifying and testing body Approved by the Client's Representative.

078 Submit all notifications under Part P of the Building Regulations to the relevant Statutory Authority.