

*Please note:*

*This is a direct copy of the technical standard contained within Developer Services Term Service Contract.*

## CONSTRUCTION OF PIPELINES & ANCILLARY WORKS

### 1.1 PIPE LAYING GENERAL

- Pipes must be fitted with end caps and shall be transported and stored using timber frame supports such that their weight is supported by the timber and not the pipe. Care shall be taken to ensure that fusion joints are not damaged.
- Pipe specification for bedding and sidefill material shall be in accordance with WIS 4-08-2A and IGN 4-08-01A and any subsequent amendments shall be laid and uniformly supported on a 100mm thick bed of pea shingle and any sharp protruding stones shall be removed. Imported finefill aggregate surround to the pipe shall be placed and consolidated in 100mm thick layers up to a level of 150mm above the crown of the pipe. Compaction above this level shall be carried out without deforming the pipe. The use of foamed concrete or normal concrete bedding and sidefill materials is not covered by WIS 4-08-02A. These materials require special consideration in use and the *Developer / Self-Lay Organisation (SLO)* must demonstrate no adverse or detrimental impacts to the pipes or fittings by consulting with the relevant manufacturers and notifying *South West Water Ltd (SWW)* of his intentions to use such products which must include documentary evidence.
- Pipes to be laid under this contract shall include ductile iron, polyethylene including barrier pipe variants, and moPVC pipes. The laying and jointing of all pipes shall be carried out in accordance with the instructions issued by the pipe and fitting manufacturers.
- Immediately prior to laying, the *SLO* shall clean out each pipe with a 10% solution of chlorox and water. This work must be carried out in accordance with the *SLO's* COSHH Assessment.
- Following washing out, the pipes shall be lowered into the trench by means of ropes, slings and shearlegs. Whilst slung iron pipes shall be rapped with a handhammer all along their lengths and especially at the ends to detect any unsoundness. All defective pipes thus found shall be put aside to await the directions of the *SWW*. Before any pipe is lowered into the trench, the accuracy of the excavation will be checked, if necessary the trench bottom shall be trimmed.
- All pipes shall be firmly and truly bedded in solid earth or imported material as specified to the lines and levels required by *SWW* and made to rest thereon for the greatest practicable portion of their length.
- Pipes with flexible joints must be laid initially in true alignment and any 'set' to the joint shall only be applied after the joint has been made. In all cases the amount of 'set' shall be as directed by the *SWW* but not normally greater than 2 degrees.

- The *SLO* shall notify *SWW* without delay, of any damaged materials which he has had to reject when offered to him for acceptance.
- For the purpose of this Clause, the expression 'pipes' shall be deemed to include valves, bends, tees and other special castings, concrete and plastic chambers, metal covers and frames and materials supplied with the pipes by the manufacturers thereof.
- PE pipes may be assembled in straight runs at ground level before being carefully lowered into the prepared trench. Care shall be taken to ensure that the completed pipelaying is not left in tension. Sufficient time shall be allowed for the pipe to relax before making the final connection; this allowance being dependent on the ambient temperature.
- If spigots for use with push fit joints are supplied with a protective sleeve, this sleeve shall be kept in place until immediately before use.
- Fittings for use with PE pipes may be made of other materials. In all cases they must be used in accordance with this Specification where appropriate or otherwise in accordance with the manufactures and *SWW* instructions
- Cold bending of PE pipes is permitted up to a radius not less than 25 times the outside diameter of the pipe. Under no circumstances will hot bending of pipes be permitted under site conditions.
- After laying, each pipe shall be examined and cleaned so there is nothing to obstruct the passage of water. The open ends of the pipe must be firmly secured with either an expanding stopper or firmly secured wooden plug or purpose built end-cap so as to prevent the ingress of any material into the pipeline. The *SLO* shall allow in his prices for this.
- A "pull-through" of an approved design shall be drawn through every pipe after it has been laid and jointed to the pipes on either side.
- Whenever the workmen are not actually present and employed on the site, the open ends of the pipe must be firmly secured with either an expanding stopper or firmly secured sealed watertight couplings so as to prevent the ingress of any material into the pipeline.

## 1.2 PE80 & PE100 PIPES

- When using coils, and before the coils are loaded onto trailers for use on site, the end caps shall be replaced with pulling heads that shall provide a complete seal against the ingress of water or dirt. The 'inside' pulling head shall be secured to the anchor on the trailer as soon as the coil has been loaded.
- Coils of 90mm and larger shall always be passed through a straightener/rerounder when being unwound.

## 1.3 PE 'SKINNED' or 'BARRIER' PIPE HANDLING

- Whilst "*Skinned*" or "*Barrier*" pipe is extremely resistant to abrasion damage, the same precautions shall be taken to avoid abrasion as if it were ordinary PE pipe. The skin is there to protect the pipe from damage during insertion. Any damage that penetrates the skin before insertion is not acceptable, and shall be cut out.
- "*Skinned*" or "*Barrier*" pipe is also stiffer than ordinary PE pipe and is more liable to Kinking when bent, so particular care shall be exercised when handling coils. Kinks are not acceptable, and shall be cut out.
- Flexible Joints shall be assembled and made strictly in accordance with the manufacturer's recommendations. Particular care must be taken with all pipes and specials that there is uniform pressure on the rubber gasket when the spigot is driven firmly home. The *SLO* shall provide any special tools or apparatus required to make these joints.

- Where flexible joints are made they are to be shaped and wrapped with Denso paste/profiling mastic and tape or similar after completion.
- Where the *SLO* is required to make flanged joints, they shall be made by scraping and cleaning the machined faces of the flanges, and the joints shall be made with an EPDM full face gasket, care being taken to see that the nuts are tightened up evenly and in the correct sequence.
- After the joint is made all joints are to be shaped and wrapped with Denso paste/profiling mastic and tape or similar.

#### 1.4 PIPE BEDDING

- All pipe bedding and sidefill materials for buried pipelines shall be in accordance with WIS 4-08-02A and IGN 4-08-01A and any subsequent amendments.
- When instructed by *SWW*, the *SLO* shall create an impervious barrier to the movement of contamination along the trench line. The barrier shall be formed by mixing Bentonite powder with GSB 'Type1' imported stone. This shall be used to backfill the trench from invert to immediately below any surface finish or construction, to create a plug one metre long.

#### 1.5 THRUST BLOCKS

- In the case of vertical changes of direction resulting in uplift, end load resistant joints should be used in preference to thrust blocks.
- The *SLO* shall design all thrust blocks in accordance with the pipe manufacturer's instructions, and shall issue specific instructions to site for each and every thrust block.
- All concrete for thrust/anchor blocks shall be grade C25, CP110, medium workability, maximum aggregate size 20mm. Grade C25 concrete shall be filled behind and/or around pipes, bends and tapers, generally in accordance with the manufacturers recommendations or specified or as directed by the Relevant Manager or his Representative.
- Horizontal bends shall be encased in concrete half-way round their circumferences on the outside of the bend and under the bend to undisturbed ground; the concrete being brought up against the sides of the undisturbed trench and the top surface sloped upwards from the outside of the bend to increase the bearing surface against the solid ground.
- Where the thrust block is too small to warrant the use of concrete from a ready-mixed supplier, pre-mixed concrete in bag form shall be used to ensure a uniform quality of concrete.
- The *SLO* shall not rely on temporary packing to support the thrust of non welded or non-anchored bends when carrying out the hydraulic pressure test on any section of the main. He shall construct the permanent thrust blocks for the bends and shall allow sufficient time to elapse before applying the test to that particular section of the main for the concrete to gain strength.
- Excavation for the thrust blocks shall not be carried out until all arrangements for mixing and pouring the concrete have been completed. Hand trimming of the face of the excavation at the back of and underneath the blocks shall be done immediately before pouring the concrete to remove any wet or soft material. Back shuttering shall not be used. The concrete shall be well rammed against the vertical face of the excavation.
- When laying bends, tees, hydrant tees, sluice valves etc., the *SLO* shall first excavate an extra depth of not less than 150mm below the bottom of the trench (or to a greater depth if required) and shall pack up the specials, valves etc. on bricks whilst the joints are made either side. Concrete shall then be poured under and around the fittings as shown on the standard detail drawing.
- All ductile iron bends and blank ends shall be anchored by thrust blocks of C20

Ordinary Portland Cement concrete. The thrust blocks shall bear on firm ground and the width of the trench shall be taken back to firm ground where necessary. The amount of concrete used must be in accordance with the details incorporated in the standard drawings. Sizing of the thrust blocks shall be by a competent designer taking cognisance of pipe diameter, pipe internal pressure and soil stiffness.

- The concrete blocks need not necessarily be confined to the actual bend, but can be split into three if necessary. Access must be left to the joints, 'knocking-up' room being left available on lead joints, and the blocks must be cast at least 48 hours before the main is subject to the pressure test.
- When constructing thrust blocks around plastic pipes, these shall be wrapped with polythene sheeting to prevent bond between the pipe and concrete, and care shall be taken not to completely surround the pipe with concrete.

## 1.6 PIPE JOINTING GENERAL

- **Spigot and Socket Jointing of DI Pipes:** To avoid introducing dirt into the seal or displacing the sealing ring during jointing, and to ensure satisfactory performance of the joint in service, the following procedure shall be followed:
  - The end caps shall not be removed until immediately before jointing.
  - The spigot shall be marked to indicate the correct insertion depth.
  - An approved joint lubricant shall be used.
  - Socket and spigot shall not be more than 3 degrees out of alignment when making the joint.
  - Particular care shall be taken to ensure spigot and socket are clean.
  - The joint shall be assembled in accordance with the manufacturer's instructions.
  - As soon as the joint has been assembled, before any surround or backfill material is placed, the joint assembly shall be wrapped and taped to prevent the ingress of any dirt or back-fill material. Due to the weight of DI pipes, the joint should be lifted slightly (using a sling and suitable lifting apparatus) to allow the wrapping and tapes to be passed under the joint correctly. Completion of the wrapping and taping may be delayed until after the pressure test, so that a visual check can be made on the joint.
  - After jointing, up to 3 degrees of misalignment is permitted up to DN300 and 4 degrees above DN300.
  - Should a joint be made using a site cut pipe spigot, this shall be cut square and then chamfered in accordance with the pipe supplier's instructions. The bare metal shall be coated with an Approved Water Quality Regulation Cl 31 material prior to utilisation.
- **Jointing of DI pipes with Mechanical Joints:** All bolts shall be completely wrapped with 'Densotape' before any surround or backfill material is placed. This may be delayed until after the pressure test, so that a visual check can be made on the joint.
- **Jointing of Socket and Spigot moPVC pipes:** To avoid introducing dirt into the seal or displacing the sealing ring during jointing, and to ensure satisfactory performance of the joint in service, the following procedure shall be followed:
  - The end caps shall not be removed until immediately before jointing.
  - The spigot shall be marked to indicate the correct insertion depth.
  - An approved joint lubricant shall be used.
  - Socket and spigot shall not be more than 3 degrees of alignment.
  - Particular care shall be taken to ensure spigot and socket are clean.

- The joint shall be assembled using a manually operated lever, and not an excavator bucket. Where the force required is too great for a manually operated lever the joint shall be assembled using the manually operated device provided by the pipe manufacturer.
- After jointing, up to 3 degrees of misalignment is permitted up to DN300 and 4 degrees above DN300.
- Should a joint be made using a site cut pipe spigot, this shall be prepared in accordance with the pipe manufacturer's instructions.

### 1.7 JOINTING OF PE PIPES WITH MECHANICAL JOINTS

- Mechanical joints for use with PE pipe shall be Type 2 joints as defined by WIS 4-24-01.
- To ensure that an effective and permanent seal is achieved, the following procedure shall be followed:
  - The pipe ends shall be cut square and shall not be scored or damaged in any way.
  - The pipe ends shall be in good alignment without any restraint before jointing, so that the completed joint will remain in good alignment.
  - If the pipe is an 'externally skinned' type such as "*Skinned*" or "*Barrier*" then the skin shall be removed with the correct skin removal tool over slightly more than the complete length of the joint. Only the correct skin removal tool shall be used, and the use of anything else is strictly forbidden.
  - The pipe ends shall be marked for the correct depth of insertion.
  - The fitting shall not be removed from its protective bag or box until immediately before use.
  - In the case of coated (such as Rilsan) fittings, no damage to the coating is acceptable, and any damaged fittings (including inserts) shall be replaced.
  - Where applicable, inserts shall be used, and these may be tapped into place, but only with a suitable soft hammer. If an insert or its coating is damaged during installation, it shall be removed and replaced.
  - The fitting shall be installed in accordance with the manufacturer's instructions, paying particular attention to bolt tightening sequence and tightening torques.
  - Where tightening torques are specified by the manufacturer, a suitable torque spanner shall be used, and this shall be regularly checked for calibration.
  - All bolts shall be completely wrapped with Densotape before any surround or backfill material is placed. This may be delayed until after the pressure test so that a visual check can be made on the joint.
  - Where undertaking work on PE service pipes requiring isolation of the supply where possible the service should be isolated using available stop tops or ferrules. PE80 pipes may be squeezed off using the appropriate sized tool providing that no previous squeeze off has been undertaken at the same point. For black Alkathene pipework where it is possible to freeze the supply, this must be done. Where freezing is not practical and it is necessary to squeeze off the supply an appropriate sized tool must be used and the area of the squeeze off should be encased in a SWW approved repair clamp, providing full circumferential sealing over the entire area of the squeeze off. It is SWW policy to replace rather than repair short-side Alkathene and galvanised communication pipes where the pipe body has failed. In instances where squeezing off long-side communication pipes results in failure of the pipe at the point of squeeze-off, or of unserviceable galvanised pipework, replacement must also be undertaken.

### 1.8 'SKINNED' or 'BARRIER' REMOVAL OF POLYPROPYLENE SKIN

- The polypropylene skin on "Skinned" or "Barrier" pipes shall only be removed with an approved tool.
- For a butt fusion joint, a ring of skin some 50 mm long shall be removed from each pipe end.
- Where approved by the *Employer* an electrofusion joint, a ring of skin some 25 mm longer than half the length of the joint shall be removed from each pipe end.
- For a mechanical joint, a ring of skin some 25 mm longer than half the length of the joint shall be removed from each pipe end.
- When preparing for a butt fusion or an electrofusion joint, the skin shall only be removed immediately before jointing.

### 1.9 BUTT FUSION WELDED JOINTS IN POLYETHYLENE

- Butt fusion welded joints in PE80 and PE100 pipes shall be made only between pipes having the same material, diameter and SDR. Joints between pipes from different manufacturers shall only be made where it is known that PE polymers are compatible and with the specific approval of the *SWW*.
- Butt fusion jointing of PE shall be carried out in accordance with WIS 4-32-08 but with a hotplate temperature of 230°C. For thick wall PE pipes the soak time shall be increased from that given in WIS 4-32-08 as per the following table.

Thickness range	Increase soak by
30mm <= thk <40mm	120 secs
40mm <= thk <50mm	180 secs
50mm <= thk <60mm	240 secs
60mm <= thk <70mm	300 secs
70mm <= thk	360 secs

- Only trained welders are to be employed and trial welds will be completed and tested before the commencement of lining work. Subsequently welding will be sampled and tested during the course of the Contract at a frequency of one per 2km length of welded pipeline.
- Butt fusion joints are to be made with an automatic fusion machine and the printouts from the machine shall be presented to *SWW* on a daily basis unless an electronic QA system is agreed with *SWW* beforehand. Evidence of calibration of the equipment shall be provided and maintained throughout the Contract.
- The internal and external beads formed on each pipe joint shall be removed using an approved debanding tool. The use of such equipment within the pipe shall be such as not to contaminate the interior of the pipe. The beads shall be referenced and presented to *SWW* for inspection.
- Bead widths to butt fusion joints shall be as detailed in the manufacturer's literature.
- A minimum of 20 minutes shall be allowed to elapse after completion of the joint before the removal of the external bead is permitted. The bead removal shall be carried out using an approved tool specifically designed for the purpose and without damage to the pipe.
- Each removed bead shall be clearly identified and submitted to *SWW* for inspection.
- If, in the opinion of *SWW*, the equipment being used to make joints is damaged or inadequate to make a satisfactory joint, it shall be replaced to the satisfaction of *SWW*.

- The tools, equipment and procedures for use with PE pipework shall be as recommended by the pipe manufacturer.
- For Butt Fusion, fully automatic equipment to WIS 4-32-16 shall be used, with dual cycle facilities as appropriate under WIS 4-32-08. The machine shall control all operation of the jointing process, including:
  - Trimming
  - Bead pressure and travel
  - Joint fusion pressure
  - Dynamic and peak drag
  - Heater Temperature
  - Heat soak time and pressure
  - Dwell time
  - Cool time, target and actual
  - Numbering of joints (completed and attempted)
  - The butt fusion machine shall data log all parameters.
- All data relating to all butt fusion joints shall be made available for inspection and shall be retained until submitted to *SWW* as part of the final job package. Protection is only required in contaminated ground. In such instances protection type P3 shall be used.
- Installation and exchange of special pipes & fittings will only fully trained persons shall be engaged in the jointing of pipes.
- No pipe, special or fitting shall be cut without *SWW*'s permission and all cuts shall be made in an approved manner. Nevertheless the *SLO* shall be responsible for the soundness of all cut pipes, specials and fittings and his price for cutting pipes shall include for conveying the cut pieces to any part of the work where in the opinion of *SWW* they may be worked into the pipe line. All cut ends of pipes shall be properly chamfered, in accordance with the manufacturer's recommendations, to suit the type of joint being assembled.
- The *SLO* shall fix all collars, junctions, bends, reducers, branch outlets, flanged hydrant pipes and all other special pipes which may be required by *SWW* to be fixed for hydrants, washouts, valve connections, variations in line or inclinations or any other purposes, including any cutting of the pipes which may be necessary to obtain the required positions of special pipes and fittings. All bends and junctions shall be backed with concrete of such dimensions as to securely anchor such bends and junctions, except for welded or other anchored joints, as approved by *SWW*.

## 1.10 ELECTROFUSION WELDED JOINTS IN POLYETHYLENE

**UNLESS EXPLICITLY APPROVED BY SWW IN ADVANCE OF UTILISATION  
ELECTROFUSION IS NOT APPROVED FOR USE.**

- Electrofusion welding of fittings shall be carried out in accordance with WIS 4.32.08.
- For electrofusion, automatic equipment shall be used capable of utilising the electrofusion terminal pins in the fittings for full audit recording. The box shall be capable of:
  - Monitoring the input voltage
  - Controlling the output voltage to the correct range
  - Monitor ambient temperature
  - Automatic time selection via electrical resistance
  - Identification of the fitting
  - Controlling the current and shut down if incorrect.
  - The electrofusion control box shall data log the following:

- Joint number
- Date and time joint made
- Ambient temperature
- Pipe scraped and clamped prompt
- Fusion time, target and actual
- Electrical current profile throughout jointing
- Joint passed/failed
- All fusion machines shall have digital data capture suitable for downloading utilising a laptop computer for subsequent analysis on a PC. The unit shall have the capacity to download from more than one fusion machine and data from more than 1000 joints.
- A fitting or an area of pipe that has been through a complete heating cycle shall not be reheated. Where a joint has proved unsuccessful, the section shall be removed to 250mm either side of the joint and the operation restarted.
- The minimum permitted distance between any two fusion joints shall be four times the outside diameter of the pipe being jointed.
- The method, time and temperatures laid down by the manufacturer and supplier for pipe jointing shall be rigidly followed.
- Pipework shall be protected from dust and rain while jointing is in progress.
- Where joints are being made on to existing systems and the material type cannot be identified, and then approved mechanical type (end loading) joints shall be used.
- All data relating to all electrofusion joints shall be made available for inspection and shall be retained until submitted to SWW as part of the final job package.
- Protection is only required in contaminated ground. In such instances protection type P3 shall be used.
- Installation and exchange of special pipes & fittings will only fully trained persons shall be engaged in the jointing of pipes.
- No pipe, special or fitting shall be cut without SWW's permission and all cuts shall be made in an approved manner. Nevertheless the SLO shall be responsible for the soundness of all cut pipes, specials and fittings and his price for cutting pipes shall include for conveying the cut pieces to any part of the work where in the opinion of SWW they may be worked into the pipe line. All cut ends of pipes shall be properly chamfered, in accordance with the manufacturer's recommendations, to suit the type of joint being assembled.
- The SLO shall fix all collars, junctions, bends, reducers, branch outlets, flanged hydrant pipes and all other special pipes which may be required by SWW to be fixed for hydrants, washouts, valve connections, variations in line or inclinations or any other purposes, including any cutting of the pipes which may be necessary to obtain the required positions of special pipes and fittings. All bends and junctions shall be backed with concrete of such dimensions as to securely anchor such bends and junctions, except for welded or other anchored joints, as approved by SWW.

## 1.11 FLANGED JOINTS

- **Jointing of Pipes with Bolted Flange Joints**
- Bolted flange joints shall not be buried unless this is approved by SWW for a specific joint, and must generally be installed within a chamber of sufficient size to allow safe access for bolting.
- In all cases, a bolted flange joint shall be protected from bending forces by the installation of a 'rocker' pipe length and two 'flexible' joints.
- Gaskets shall be of un-reinforced EPDM and SLO shall be required to justify the use of any other material to SWW and obtain specific approval for its use.



- Particular attention shall be paid to the pipe manufacturers instructions regarding bolt tightening sequence and torque, and The *SLO* shall use calibrated torque spanners where these are specified.

### 1.12 RUN LEAD JOINTS

- The use of lead in making joints to mains is no longer permitted. Where a repair to an existing Run lead joint is required, the whole joint is to be removed and pieced through using pipework and mechanical fittings of the appropriate size and type.

### 1.13 PROTECTION OF FERROUS PIPES, JOINTS & FITTINGS

- **SWW Additional Requirements:** The *SLO* shall comply with the following additional requirements, in order to protect the pipe (and its protective coating where applicable) from damage, make good any damage that does occur, and ensure the effective performance of all pipes and joints in service.
- **Handling:** End caps shall not be removed until immediately before jointing. Should end caps be removed prematurely, the pipe shall be returned to stores for washing out, chlorinating and recapping. This shall not apply in the case of inadvertent removal provided that no dirt gets in and the caps are immediately replaced.
- Where the pipes are supplied with a protective coating, care shall be taken during handling and laying that this coating is not damaged.
- Pipes shall always be lifted using webbing slings, never with chains, and lifting with pipe hooks that slip into the pipe ends is strictly forbidden, even though the manufacturer may say it is permissible.
- If any damage is done to the pipe coating, this shall be made good by wrapping with Densotape subject to approval by *SWW*.

### 1.14 'SKINNED' OR 'BARRIER' PIPE & SERVICE FITTINGS WITHIN CONTAMINATED GROUND

- Polyethylene pressure pipe systems with an aluminium barrier layer for potable water supply in contaminated land must comply with WIS 4-32-19. When joining polyethylene barrier pipes, only fittings which have demonstrated to maintain the integrity of the pipe system should be used. The *SLO* is advised to ensure that he is fully conversant with *SWW* approved supplier and system for polyethylene barrier pipes.

### 1.15 CUTTING PIPES

- The use of any disc saw (Stihl saw), with or without dust suppression will not be permitted when cutting Asbestos Cement pipe or epoxy or polymeric lined pipes. The *SLO* shall use a method which satisfies all current Health and Safety legislation.
- The use of a disc saw (Stihl saw) within the confines of a pipe trench or repair pit is not permitted.
- The *SLO* shall refer to and comply with the following publications when cutting pipes, in particular, those pipes which have been subject to lining or Slip lining works: WRc - Pipe Material Selection Manual; WRc PE Manual; WRc Trunk Main Repairs.

### 1.16 INSTALLATION / EXCHANGE OF SLUICE VALVES, PRVS & NRVS, ETC

- Unless expressly approved by *SWW*, sluice valves shall be installed so that the spindles are truly plumb and extension spindles fitted so that the key head is a maximum of 500mm below the adjacent ground level.
- The Cast or Ductile Iron surface box shall be fixed such that, when a key is fitted to the valve, it shall have equal clearances with the sides of the box.
- The following Technical standards shall be complied with for the installation of mains fittings: **ENG-TS-ENS 105; ENG-TS-ENS 107 and ENG-TS-ENS 109 (these are currently being updated)**. Deviation from these standards is subject to *SWW* written permission.
- The *SLO* shall install new valves or replace, existing defective valves and shall erect chambers, surface boxes and marker posts complete with marker plates and numerals in the positions shown on approved drawings or where required by *SWW* to the details shown on the standard drawings included with the Specification. Marker posts, plates and numerals shall be installed before or within 24 hours of the main being returned to service.
- Unless expressly approved by *SWW*, sluice valves shall be installed so that the spindles are truly plumb and extension spindles fitted so that the key head is a maximum of 300mm below the adjacent ground level. The Cast or Ductile Iron surface box shall be fixed such that, when a key is fitted to the valve, it shall have equal clearances with the sides of the box.

### 1.17 INSTALLATION/EXCHANGE OF HYDRANTS OR WASHOUTS

- The following Technical standards shall be complied with for the installation of mains fittings: **ENG-TS-ENS 106 and ENG-TS-ENS 108 (these are currently being updated)**. Deviation from these standards is subject to *SWW* written permission.
- The *SLO* shall install new washouts or replace, existing washouts or hydrants and shall erect chambers, surface boxes etc and where directed marker posts complete with marker plates and numerals or replacement of marker plates, where required by *SWW*. Where directed, marker posts, plates and numerals shall be installed before or within 24 hours of the main being returned to service.
- The hydrant shall be fixed so as to be truly plumb and in such a position that the top of the outlet is not more than 300mm below the surrounding ground level. Double flanged extension pieces to fit below the hydrant will be provided to enable this height adjustment to be made. The cast or ductile iron surface box will be positioned such that when a key and standpipe are fitted to the hydrant, equal clearances exist around the sides of the box.
- All flange joints shall be made and wrapped as previously described.
- Where directed, marker posts, plates and numerals shall be installed immediately the main is returned to service.

### 1.18 INSTALLATION OF CHLORINATION POINTS

- Where instructed by the *SWW*, the *SLO* shall install chlorination points comprising a combination of sluice valves and hydrants/washouts all as specified.
- Surface boxes are to be positioned true and square and in line and double flanged distance pieces shall be inserted between the fittings where necessary to achieve this.

### 1.19 CONNECTION TO EXISITING MAINS

- Any connection to be made between a new main and an existing live main will be carried out under Tee Insertion or Mains Connection and with due regard to the relevant clauses of this specification.
- Where it is anticipated that customers' supplies will be interrupted as a result of connection, the SLO shall arrange for those customers affected to be notified in accordance with SWW specification.
- The SLO shall consider the following aspects when planning such connections: area of excavation required to allow for jointing room; the time and labour involved for the main to empty once it has been shut down and for pumping water from the main out of the trench and its dechlorination where necessary.
- The SLO shall also allow for taking trial holes that may be required in order to locate existing water mains to which such connections are to be made.
- The SLO shall not, without the express permission of SWW; operate any sluice valves for shutting off the mains for the connection to be made.
- For the installation/exchange of valves, hydrants, fittings etc. as detailed in the specification above, valving operations will be carried out as per the specification. The SLO should liaise with SWW to arrange such shutdowns giving at least 21 days notice.
- The timing of shutdowns will be determined by SWW the SLO shall arrange his working programme around the time stated.
- The SLO shall allow for waiting time while valves are operated and any mains drain down time required.
- The SLO shall maintain pumps as required at working locations sufficient to cope with flows from mains drain down to maintain the water level in the excavation below the invert of the main to prevent any contamination occurring.

## 1.20 UNDERPRESSURE MAINS CONNECTIONS

- The SLO **must** make connections to existing mains by means of under pressure drilling using under pressure tees and valves.
- All under pressure drilling equipment is to be supplied by the SLO.
- Prior to fitting the under pressure tee to the main, The SLO must thoroughly clean all external corrosion and coating material from the parent pipe and must confirm the outside diameter by means of callipers.
- Prior to drilling The SLO must pressure test the Underpressure Tee and Sluice Valve assembly on the parent pipe to the rated pressure of the pipe or one and a half times the normal working pressure whichever is the greatest.
- After drilling the 'coupon' taken from the existing main is to be labelled with the location and the date of the under pressure drilling and handed to SWW.
- All equipment and fittings used are to be disinfected in accordance with this specification.

## 1.21 LINE STOPPING MAINS CONNECTIONS

- The SLO **must** make connections to existing mains where supplies must be maintained to customers, using line stopping technique (single and multiple stops) using under pressure tees, valves and appropriate pressure rated and approved pipework.
- All line stopping drilling equipment is to be supplied by the SLO.

- Prior to fitting the line stopping tee to the main, The *SLO* must thoroughly clean all external corrosion and coating material from the parent pipe and must confirm the outside diameter by means of callipers.
- Prior to drilling The *SLO* must pressure test the Underpressure Tees, pipework and sluice valve assemblies on the parent pipe to the rated pressure of the pipe or one and a half times the normal working pressure whichever is the greatest.
- After drilling the 'coupon' taken from the existing main is to be labelled with the location and the date of the under pressure drilling and handed to *SWW*.
- All equipment and fittings used are to be disinfected in accordance with this specification.

## 1.22 REPAIR & MAINTENANCE

- Compliance with The *Employer's* ISO procedure QSC 006 is mandatory
- All repairs to Iron and Asbestos Cement pipes that require cut out shall be made with Ductile Iron pipe.
- Repairs to moPVC and polyethylene pipe shall be repaired with polyethylene pipe and mechanical fittings.

## 1.23 REPAIRED MAINS PROCEDURE

- *SWW* procedure QSC-006 Repair of Burst Mains must be followed. Also note the length and location of the section of main being sampled for future reference in case repeat samples are necessary.
- Before Sampling: If any flushing or swabbing is required, then this should be carried out in accordance with *SWW* procedure QWD-160.
- Sampling: Samples should be taken during flushing, preferably from a proper sampling tap. Any sampling necessary must be done in accordance with *SWW* procedures QSC-024. Collection of samples for Laboratory Analysis QSC-025 sample Transportation and QSC-126 Sample Labelling. All on site tests must be done in accordance with the following procedures:
  - QSC-011 On Site Determination of Chlorine
  - QSC-012 On Site determination of Ammonia
  - QSC-013 On Site Determination of pH
  - QSC-014 On Site Determination of Taste and Odour
  - QSC-015 On Site Determination of Conductivity

***Please note:***

***This is a direct copy of the technical standard contained within Developer Services Term Service Contract.***