



Water Services Section

Specifications for Drinking Water Services

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PART 1. GENERAL

1.1 Purpose and Applicability

These specifications set out detailed requirement for water distribution services in the interests of protecting the quality of drinking water supply in the county, of promoting water conservation and of supporting the efficient management of the water distribution system.

Alterations to existing water supply installation as well as all new works are required to comply with these specifications unless otherwise authorised in writing by the Water Services Section of Dun Laoghaire Rathdown County Council. The specifications also apply to private developments which are not to be taken-in-charge. Failure to comply with this Specification may result in denial of a water connection to the Council's network, the curtailment of water services, the retention of security Bond and/or the rejection of an application to take-in-charge.

1.2 Regulations and Taking-in-Charge

All works must comply with this Specification and with relevant national regulations and standards. Where water services are intended to be taken-in-charge by the Council, the "Dun Laoghaire Rathdown Taking in Charge Policy" document should also be consulted.

1.3 Website

The Dun Laoghaire Rathdown County Council website www.dlrccoco.ie provides the following:-

- Water Connection Application Form & Conditions of Water Supply
- Dun Laoghaire Rathdown Taking in Charge Policy
- Specification for Drinking Water Services (latest version of this document)
- List of Contacts, including the Council's Local Water Services Depot

1.4 Terms & Abbreviations

Note that definitions below apply to these specifications and may differ from those in other documents

"Approve" and **"Approval"** means the written approval of the Water Service Section of Dun Laoghaire Rathdown County Council

"Approved" means in full conformity with these specifications or as approved in writing by the Water Services Section of Dun Laoghaire Rathdown County Council.

"Boundary Box" means an enclosure (usually placed in a footpath) or box into which devices can be placed to close off, control and/or measure the water supply entering a *Premises*. It may also be used to identify and verify supply pipe water leakage; to facilitate the service testing of pressure and flow of water and to monitor water quality.

"Direct connection" means connected to pipework which is directly supplied from the Council's water network other than via an **approved** backflow prevention device or via a cistern or storage tank. **"Directly connected"** means supplied from a **direct connection**

"The Council" refers to Dun Laoghaire Rathdown County Council

"Water main" means a buried pipe in a common area (whether taken-in-charge or not) which is **directly connected** to the Council's water network and supplying more than one premises

"Water Management and Conservation Plan" means a plan prepared by a competent person or body corporate (acceptable to the Council) which sets out details of how best practice in water usage and conservation will be applied in respect of the proposed development to include water mains and internal plumbing.

1.5 EU Directive on Materials, Pipes and Fittings

Nothing stated in this Specification is to be construed as discriminating against products and materials manufactured in any of the Member States of the European Union.

Where items to an Irish Standard Specification, a British Standard Specification, or any other Standard Specification of a Member State of the European Community are called for, this requirement shall be read as including items to the relevant national standard of any Member State of the European Community, which provides an equivalent guarantee of safety and suitability.

PART 2.

NEW CONNECTIONS & EXTENSION OF SUPPLY

2.1 Application for a Connection

- Any person requiring a new or additional water supply should first contact the Council to ascertain if an adequate water supply is available.
- To obtain a new water connection, an application must be made on the official application form which is available from the Council's public offices or website
- Applications for water connections must be made at least 1 month in advance of commencement of works on site. Connections will be made by the Council at the expense of the applicant.
- Where a connection is proposed to a private water main, the applicant must submit evidence that permission has been granted from all owners of the private water main for such a connections.
- Where excavation in public roadway or footpath is involved, the applicant is responsible for obtaining an appropriate Road Opening Licence from the Council's Transportation section.
- Prior to making a formal application for a connection to the Council's water network applicants must comply with the requirements for all Bonds/Securities as outlined in the Planning Conditions, where relevant.
- When applying for tappings on developments over 20 houses, the applicant should submit a drawing with house numbers marked.

2.2 Plans

On foot of a planning application or otherwise, the following information must be submitted to the Water Services Section for **approval** before commencement of any works connecting to the Council's water network,

- 3 no. site location maps to a scale of 1:1000 showing the proposed development layout of roads and proposed water mains.
- 3 no. plans of a scale not less than 1: 500 showing the layout of roads, buildings, proposed water mains, connecting point(s), water network layout details and other services.
- 2 no. dimensioned sections through the proposed roads and footpaths showing location of all services (existing and proposed) including water mains and confirming acceptable horizontal and vertical separation distances from these other services (see section 3.11)

- Except in respect of a new single dwelling or extension to an existing single dwelling, a Water Management and Conservation Plan, prepared by a competent person setting out details of how best practice in water usage and conservation will be applied in respect of the proposed development to include water mains and internal plumbing.
- A covering letter:
 - Stating whether the scheme is going to remain private or be taken in charge.
 - Quoting the Planning Permission Reference Number(s), where relevant.
 - Stating an indication of the date at which the connection(s) to the Council's water network is desired.

2.3 Wayleave/ Easement

If any water main is passing through private property, proof of approval for wayleave / easement rights should be obtained in advance of notification to the Council and submitted with the planning application and water connection application. The applicant must submit a way leave for any public water main laid through private property, whether or not it is intended that the property will be taken-in-charge. Council approval of a water main does not imply approval of applicant's legal entitlement to lay the water main.

2.4 Authorised Personnel

It is illegal for anyone other than authorised Council staff to make a connection to a water main, notwithstanding the fact that the water main may be laid in private property or not be in charge.

2.5 Inspection and Connection

A Council representative may inspect the work from time to time. Materials and workmanship may be subjected to such tests as the Council may direct. The applicant must supply samples of materials and/or proposed sources of materials, as may be selected and required by the Council. Before a connection is made, the applicant is responsible for ensuring that:

- All works have been designed and installed in accordance with this Specification.
- Pressure, sterilization and bacteriological tests have been carried out and approved [See Part 6 below]
- All payment due to the Council, including contributions due under the Planning and Development Acts, have been made.
- All requirements for Bonds and/or Securities, outlined in the Planning Conditions, have been met.

PART 3. DESIGN AND STANDARDS

3.1 General Design Requirement

It is the responsibility of the applicant to ensure that the works are designed such that:

- the supply arrangements are adequate in terms of flow and pressure to meet the requirements of the development, particularly in the case of buildings above 2 storeys high, including requirements for fire fighting purposes
- the wholesomeness of any water destined for human consumption is not impaired
- all fittings and appliances are specified to use water as efficiently as practicable and to promote water conservation

- all water supply installations are designed to comply with these specifications.
- the design provides for adequate and appropriate water storage for the intended use of the premises
- the end-user is provided with information for the future management and maintenance of water installations
- the Council's Water Services are provided with record drawings of all services in public areas. These "as-built" drawings are to be provided in both paper and electronic format except where agreed otherwise.

Applicants are reminded that all water service installations, including those in private estates which are not to be taken-in-charge, are required to comply with these specifications.

3.2 Adequacy of Supply

It is the responsibility of the applicant to ascertain whether or not the Council's water mains have sufficient capacity to meet the requirements of the proposed installation. The pressure in water mains can vary over time for operational reasons. The normal minimum service pressure in water mains is 15m, though pressures may be reduced below this at night for water conservation purposes and design should take account of this.

Waters of varying degrees of hardness and pH may be received in any particular part of the water supply area. The applicant should ensure that the hot water and the cold water supply installations and appliances in the premises are suitable for the type of water supplied.

3.3 Protection of Water Quality – Materials and Fittings

All water installations must be designed to protect the wholesomeness of drinking water. Materials or substances which could cause contamination of water must not be used in the construction or installation of any appliance, water fitting or pipe which conveys portable water. Wherever relevant, all installations must comply with Part 5 (Materials and Fittings) below or otherwise with appropriate National or EU standards.

3.4 Protection of Water Quality – Connections and Interconnections

To avoid the danger of back siphonage, no appliance may be **directly connected** to the Council's supply unless an *approved* backflow prevention device is used. In single dwellings, the kitchen cold tap(s) must be **directly connected**; otherwise, all appliances, sanitary fittings and other outlets in a dwelling must be supplied from storage cisterns.

In order to protect public health and to avoid risk of contamination, no premises connected to a public water supply may have a piped connection to any other water source, whether spring, well, rainwater or other natural or recycled water, except where the **approval** of the Council has been obtained – see Section 3.6 below.

3.5 Water Conservation

3.5.1 WC suites, whether new or replacement, must be dual-flush and have a maximum flush of 6 litres.

3.5.2 Plumbing systems and all fittings and appliances must be of a type which achieves the objective of conserving water. Automatic flushing cisterns must be specified such that there is not excessive use of water.

3.5.3 Porous hose irrigation systems or fixed soil watering systems must not be specified

3.5.4 The Council encourages, and may require, the use of water from non-potable sources such as rainwater-harvesting, grey water re-use or private wells for irrigation, vehicle-washing and other external applications. Pipework and fittings containing such water must not be **directly connected**

under any circumstances and must not be routed nor located within buildings without the **approval** of the Council – see Section 3.6 below.

3.5.5 Where projected daily water requirements exceed 50,000 litres, a Water Conservation Policy Statement must be submitted for **approval** to the Council. Such statement must set out:

- Details of all water mains supplying the premises;
- The internal plumbing arrangements;
- The number of staff employed in or using the premises and an estimate of daily water requirement for the next three years
- A full list of all water using appliances, together with their capacities and consumption rates
- Details of any water recycling and reuse

3.6 Use of water from non-Council sources

Where an applicant proposes to use water within premises from non-Council sources such as private wells, rainwater harvesting or grey water re-use systems, **approval** from the Council's water section must be obtained. The general requirements are:

- All pipework is to be labelled to avoid misconnection or accidental consumption of non-potable water. Labels should be of the self-adhesive or wrap-around type and extend for the full length of the pipework. The label must carry the marking "RECLAIMED WATER" in black text 5mm in height on a green background and must be at least 100mm long. The size of the lettering and labels should be increased as the pipe diameter increases.
- Systems requiring the option of top up with water from the Council's water system must provide a secure connection which is immune from accidental cross-contamination and/or backflow. This is normally provided from a connection to the high-level rainwater storage tank, via an unrestricted air-gap device (AA device, IS EN 1717). For further information on the protection of potable water installations from pollution and backflow, please refer to the current version of IS EN 1717.

3.7 Metering

3.7.1 In all cases where a development consists of multiple units, whether domestic or non-domestic, provision must be made for the sub-metering of water consumption to each individual unit to the **approval** of the Council. Each sub-meter location must be capable of being fitted with a water meter which can be read safely and without contacting the customer.

3.7.2 *Approved* master-meter chambers must be provided which are suitable for the fitting of Council *approved* meters and which record consumption to all distribution pipes and sub-meters within the development. Metering and valving of domestic and non-domestic use must be entirely separate. Meters and valves must be in locations accessible at all times to Council staff. Meters on supplies which are designed for fire-fighting use must be of an *approved* type which does not excessively restrict flow. These requirements apply to estates which are not to be taken-in-charge as well as to multi-unit premises.

3.7.3 Each building in an apartment complex must have a meter box suitable for fitting a Council *approved* master-meter. Each apartment must have a separate supply which can be fitted with a sub-meter to record all water used in the apartment and which can be safely read without the need to contact the consumer.

Connections, Service Pipes and Boundary Boxes

An existing water supply, whether domestic or non-domestic, shall not be extended nor connected to another premises without the **approval** of the Water Services Section.

Each dwelling shall have a separate and individual connection to the Council's network unless otherwise *approved*. In apartment developments or private estates (where water mains are not to be taken-in-charge) details of connections to the Council's network shall be *approved* in detail before construction commences.

All service pipes, both domestic and non-domestic, shall incorporate an *approved* boundary box with integral stopcock into which devices can be placed to control and measure the water supply entering a property.

3.9 Water Storage

Each premises must be fitted with a cold water storage facility adequate and appropriate for the use of the Premises and sized for a minimum of 24 hours normal usage. Storage cisterns must be of an *approved* type to protect the quality of stored water.

Guideline storage volumes for domestic and non-domestic premises are shown below. Any non-domestic users whose activities are critically dependent on a continuous water supply are recommended to consider storage in excess of the 24 hr minimum.

Building or Use	Minimum Cold Water Storage for new Developments using low flush and dual flush WCs
Dwelling house or Apartment up to 2 Bedrooms	225 litres
Dwelling house or Apartment 3-4 Bedrooms	320 litres
Dwelling house or Apartment over 4 Bedrooms	450 litres
Hostel's (with communal bathrooms)	90 litres per head
Factory	45 litres per head of staff
Hospitals, maternity	455 litres per bed
Hospitals, general	227 litres per bed
Hospital staff (non residential)	45 litres per head
Hospital, nurses home & medical quarters	136 litres per head
Hotels (bedrooms with private bathrooms)	600 litres per bedroom
Offices	45 litres per head of staff
School, day, boys	23 litres per head
School, day, girls	36 litres per head
School, boarding	136 litres per head
Restaurants and canteens	18 litres per meal

3.10 General Design Criteria for Water mains

Water main pipe sizes and layout must be in accordance with the requirements of the Water Section. The following general criteria apply to all water mains unless otherwise *approved*:

- Unless otherwise *approved*, the minimum diameter of water mains is to be 100mm. Developments of more than 50 houses require a designed solution generally incorporating 150mm diameter spine water mains with 100mm loops.
- Water mains in industrial or commercial developments must be a minimum of 150mm diameter.
- The preferred materials for water mains up to 300mm dia are HPPE and Ductile Iron, the latter to be used in all roadways other than local roads. Other materials may be used only with **approval**.
- House connections must not be taken across roads except with the **approval** of the Water Section in which case they must be sleeved in a 50mm duct.
- Water mains may terminate in a dead end only with Council **approval**, in which case a duckfoot hydrant must be provided at the dead end.
- The design of water mains of 300mm diameter or greater must be *approved* in detail.
- Developments consisting of more than five domestic units must incorporate into the water mains, in accordance with the Council's detailed requirements, a chamber or other *approved* facility for the installation of a Bulk Water Meter to measure the total (bulk) volume of water which will be delivered to that development or estate.
- Hydrants must be provided in accordance with Sections 5.6 and 5.7 below

3.11 Water mains – Location and Clearances

Applies to all water mains whether or not in public areas or to be taken-in-charge.

- Water mains must not be laid under walls or areas designated for trees/shrubs/flowerbeds.
- A surface water or foul sewer may not cross over a water main
- No service may run directly above along the length of a water main.
- Unless otherwise **approved**, a water main may not be laid within the curtilage of a premises

The following minimum clearances are required:

Water main Diameter	Up to and including 150mm	Up to and including 500mm	Greater than 500mm
From curtilage of private premises	1m	3m	6m
From any structure	3m	5m	8m
From other services – Horizontal clearance	0.3m	0.5m	1m
From other services – Vertical clearance	0.25m	0.25m	0.5m

No structure may be erected which would result in a lesser clearance to an existing water main unless otherwise *approved*.

3.12 Notification

Where pipes or ducts are to be laid close to an existing water main the Council's Local Water Services Depot must be notified in writing a minimum of one week in advance of the works. In case of large diameter (300mm or greater), the water section must be notified one month in advance of the works. These notification requirements are in addition to any the formal procedures detailed above

3.13 Water mains Cover

All water mains must have a minimum depth of cover of 750mm and maximum depth of 900mm measured from the top of the pipe to the finished ground surface.

3.14 Thrust Blocks

Thrust blocks must be provided at locations where the pipe needs to be restrained against movement arising from pressure within the water main. Thrust blocks must be designed in accordance with CIRIA Report 128 'Guide to the design of thrust blocks for buried pressure pipelines'. Design and dimensions of thrust blocks should be indicated on construction drawings.

3.15 Sluice Valves

Sluice valves must be provided at all branches in water mains and as necessary to permit the isolation of properties/dwellings in groups of not more than 40.

3.16 High Rise Buildings

3.16.1 General: It is necessary to use break tank and booster pumps on all buildings 3 storeys or higher as pressure in public water mains can vary for operational reasons and a minimum daytime target pressure of 15m in the Council's water network should be assumed.

For multiple occupancy buildings, the service manifold for each separate unit must be located in an accessible area at a location agreed by the Water Section; see also Metering requirements at section 3.7. Unless otherwise *approved*, only indirect pressure boosting will be permitted i.e. pumping from a break tank supplied from the public water main.

3.16.2 Submission of Boosting Plans for Approval: Before installing booster pump(s) full details of the proposed installation must be submitted to the Water Section for *approval*. The effective capacity of a break tank should be decided after due consideration of the total water storage requirements and its' location within the building but should not be greater than 30% of average daily requirement unless otherwise *approved* by the Water Section in writing.

The following details must be submitted for *approval*:-

- (a) Full plumbing layout of the building indicating pipe sizes, storage tank capacity, flow locations of draw off points etc.
- (b) Volume, location, dimensions and specifications of break tank(s).
- (c) Maintenance schedule for the system, - pump inspection/maintenance and tank cleaning.

3.16.3 Break Tanks must:

- be a closed vessel having a tightly fitting access cover bolted or screwed in position

- be suitably lined or coated to preserve the potability of the water;
- have an air inlet and an overflow pipe or pipes all suitably screened against insects and vermin
- be insulated against heat and be supplied exclusively from a service pipe, via a ball valve
- comply with "BS EN 1508:1999 Requirements for systems and components for the Storage of Water" or subsequent standard
- be suitably maintained – i.e. inspected and regularly cleaned

3.16.4 System Maintenance

The applicant must supply to the building owner and/or management company full details of the booster system and break tank installation. These details should include a recommended maintenance schedule for the system including cleaning of the break tank.

PART 4. CONSTRUCTION AND INSTALLATION

4.1 Compliance with Design & Standards

Construction and installation of all water services, including those in private estates not being taken-in-charge, must be carried out in accordance with these specifications and any detailed approvals issued in respect of Part 3 above.

4.2 Transportation / Storage

Suitable pipe supports shall be used on vehicles transporting pipes to prevent damage to both internal and external coatings by scratches etc. Timber supports are needed during transportation and stacking on site. (Do not store pipes in areas where grass is likely to grow due to the risk of grass fires that may damage the stored pipes in due course.)

Use wide fabric purpose-made slings or suitable designed machine for lifting pipes during off-loading and/or laying pipes (particularly flexible pipes with concrete or cement-mortar linings) to avoid scratches to coatings and damage to pipe ends. Damaged pipes may not be used.

4.3 Trench Details

The trench width shall be pipe diameter plus 100mm subject to a minimum of 500mm unless otherwise approved. The trench bottom should be free of hard objects such as stones, rock projections, and tree roots. Where the trench bottom is through rock or shows a recurrence of hard objects, allowance should be made for an additional thickness for under bedding of at least 50mm.

4.4 Pipelaying

All pipes shall be examined internally for dirt, stones, or any foreign matter and shall be thoroughly cleaned before laying in final position. To prevent foreign matter or vermin entering the water main as it is being laid, all open ends of laid pipes shall be plugged until the next pipe is ready for insertion.

4.5 Bedding & Backfilling

All pipes shall be laid on a 150mm bed of rounded single sized pebble of 10mm nominal diameter or sand and haunched and covered to a depth of 300mm above the crown with similar material. The bedding directly underneath and directly over the pipe shall be lightly compacted while the sidefill shall be well compacted.

Pipes shall not be supported by stone or rock at any point. Rock shall be excavated to a depth of 150mm below the actual depth of trench required and backfilled with DOE Clause 503 prior to laying the pebble bed

In ground that contains ashes or chemicals or material that could accelerate corrosion or deterioration of the pipe, the material to be used and method of laying shall be approved by the Water Section prior to laying.

All trenches in or near roadways shall be backfilled to the requirements of the Council's Transportation department and in compliance with the *Guidelines for the Opening, Backfilling and Reinstatements of Trenches in Public Road*.

Mechanical compactors should not be used until the total depth of backfill over the pipe exceeds 450mm.

4.6 Pipe Warning

All pipe work to have a 400mm wide water warning mesh - Plyage HR 40D blue polyethylene warning mesh or similar *approved* – laid over the centerline of the pipeline and tied to valves at a depth of 350mm below finished ground level. Plastic pipes shall have warning mesh as above but incorporating a polypropylene reinforcing band of stainless steel tracer wire. Tracer wire is to be rejoined before backfilling if broken during works

PART 5. MATERIALS AND FITTINGS

5.1 Water mains / Pipes

The preferred material for watermains up to 300mm dia is either HPPE or Ductile Iron, the latter to be used in all roadways other than local roads. Other materials may be used only with *approval*.

- **HPPE** pipes should be of type PE-100 and have an SDR rating of 17. They shall conform to UK Water Industry Specification No. 4-32-17.
- **Ductile iron pipes** must conform to Class K9 of EN 545. Ductile iron fittings must be either Class K9 or K12. Ductile Iron pipes and fittings must be cement mortar lined with sulphate resistant cement and sealed with an *approved* epoxy resin sealcoat. External protection must include a zinc coating to EN 545 under bitumen based coating to BS 3416: 1991

Where other materials are *approved*, they shall meet the latest version of the following standards:

- **MoPVC pipes** must conform to the UK Water Industry Specification No. 4-31-08 and manufacturers must operate a quality system in compliance with BS 5750 Part 2 (EN29002).
- **MDPE** pipes should be of type PE-X-80 and have an SDR rating of 11. They must conform to IS EN 12201: Part 2: 2003 and UK Water Industry Specifications - 4.32.03 to 4.32.05 (inclusive) and 4.32.13.
- **Steel pipes** must conform to BS EN 10224.

5.2 Service Pipes & Fittings

Service pipes to individual dwellings must be of blue MDPE 20mm O.D. to BS 6572:1985. The Water Section must *approve* the diameter of other service pipes in advance. The service pipe must be laid without mechanical joints from the boundary box to a stop valve inside the premises with **600mm minimum cover** to finished ground level

5.3 Boundary Boxes

All service pipes (both domestic and non-domestic) up to 25mm must include the installation of a boundary box of an *approved* design and compatible with the Council's meters. Boxes must have a telescopic body, a circular sealed lid which is capable of angular adjustment and incorporate isolation valve, non-return valve and push-fit outlets. The minimum depth from lid to the top of the meter is 250mm. Where possible the boundary box shall be located in the footpath fronting the property being served, and 225mm from the outside of the boundary. The lid and boundary box should have a loading resistance to match their location.

5.4 Control Valves on Water mains

Unless otherwise specified or *approved* by the Council, all gate valves on water mains must be sluice valves. Sluice valves must be double flanged ductile iron, metal tongued for water main purposes and must comply with the relevant requirements of EN1074. The number of turns to open/close the valve must be $n=2N + 1$ where N = the equivalent diameter in inches. All flanges must be drilled to P.N. 16.

The spindle must be fitted with a cast iron oval false cap (complete with grub screw). Depth from ground level to the top of the valve spindle must not be greater than 600mm unless otherwise *approved*. The operating torque should not exceed the maximum allowed in EN 1074, with written test results required.

Sluice Valves must be coated with an electrostatic epoxy powder spray, or bitumen-trichloroethylene solution to U.K. WRAS or an alternative Council *approved* coating. All sluice valves are to be operated from above ground with a valve key and must be **ANTI-CLOCKWISE CLOSING**.

Details of valves on pipes with diameters greater than 400mm must be *approved* in advance by the Water Services Section who may require:

- Valves to be installed in chambers
- Smaller diameter valved bypasses to alleviate unbalanced pressures
- Remotely operated butterfly valves

5.5 Scour Valves

Scour valves shall be flanged and have the following diameters :

Diameter of Main (mm)	Diameter of Scour (mm)
Not exceeding 100	50
100 to 200	75
200 to 600	100
600 to 800	150

5.6 Hydrants

Hydrants shall be manufactured in accordance with BS 750: 2006 Type 2 and shall incorporate a screwdown valve, underground 'guide in head' type with bayonet lug outlets and false spindle cap of cast iron and iron chain. Hydrant

heads should be between 50mm-150mm below finished ground level. The hydrant valve shall be ANTICLOCKWISE OPENING. Hydrants must be coated with an electrostatic epoxy powder spray, or bitumen – trichloroethylene solution to U.K. WRAS or an alternative Dun Laoghaire County Council *approved* coating.

5.7 Location of Hydrants

Provision of hydrants and locations shall comply with the requirements of the Building Regulations 2006 Technical Guidance Document B. Hydrants serving non-domestic properties shall be subject to the approval of the Chief Fire Officer. Other than in rural areas, no domestic property shall be more than 46m from a hydrant unless otherwise approved.

5.8 Air Valves

Air valves shall be Double Air Valve type with isolating valve and shall have bodies and covers of cast iron to BS EN 1561 with flanged inlets of the size specified below. Valves shall be flanged and drilled to BS EN 1092. Each valve shall have a large and a small air escape orifice with an isolating valve. The isolating valve shall be a resilient seated gate valve to BS 5163 Type B (BS EN 1074) and shall be of the boltless bonnet design.

The inlet diameter shall be in accordance with the following table:

Diameter of Main	Up to 200mm	225mm to 350mm
Diameter of Branch	50mm	75mm
Bore of Valve Inlet	50mm	75mm
Min clear opening of surface box	450mmx300mm	580mmx300mm

On water mains up to 150mm diameter, air valves shall be provided at all summits unless a service connection exists within 2m of the summit. Air valve design on larger water mains must be *approved* in advance.

5.9 Protection of Pipes

Unless otherwise *approved* by the Water Section, pipes should be buried underground for safety, security and protection against vandalism, weather and fire.

5.10 Valve Chambers

Chambers for sluice valves, airvalves and hydrants shall be provided with cast iron surface boxes complying with I.S. 261. Precast concrete, in-situ concrete or preformed chambers 450mm x 300mm x 450mm may also be used subject to *approval*.

Sluice Valve Surface Boxes: Cast Iron 100mm diameter clear opening.

Hydrant Surface Boxes: Cast Iron 375mm x 225mm x 150mm deep with appropriate identification mark on cover.

Air Valve Surface Boxes: Cast Iron 450mm x 300mm x 150mm deep Cover to be perforated

Surface Covers: Valve and hydrant chambers when installed shall be covered with *approved* heavy-duty metal surface covers to I.S EN 124: 1994. Surface boxes shall be bedded in mortar on the chamber walls and, where the chamber

is located other than on a footpath, driveway or carriageway, shall be surrounded by C25/30 concrete 150mm wide, 100mm thick.

5.11 Indicator Plates and Marker Posts.

Indicator plates shall clearly identify hydrant, air valve and sluice valve locations and baseboards located to the **approval** of the Council and shall comply with B.S. 3251. They shall be mounted at the back of footpath or in the boundary wall of the public thoroughfare nearest to the hydrant or valve.

Hydrant indicator plates: shall have fixed black letters complying with BS 3251 except that the plates shall conform to colour reference n. 309 (canary yellow) in B.S. 381C. The plate shall show the diameter of the water main (in mm) and the distance of the marker from the hydrant (in M)

Air valve and sluice valve indicator plates: shall comply with the specification for single hydrant indicator plates with fixed letters in BS 3251 except that they shall be coloured white and, instead of the letter H, shall bear the letters AV and SV respectively as *approved*.

Marker posts shall conform to IS 162 and set 450mm into 0.06m³ of 20N/40mm concrete.

PART 6.

COMMISSIONING OF NEW WATER MAINS

Before final connection to the network, all new pipework must be swabbed, pressure tested, disinfected and tested for bacteriological contamination.

6.1 Swabbing

Prior to pressure testing, any newly laid or renovated water main shall be cleared by passing a foam swab of agreed texture through for final cleansing. In general swabs shall be soft absorbent hard-backed foam, of medium grade with a minimum diameter of 25mm greater than the nominal internal diameter of the pipe, up to and including 300mm pipework and 50mm greater for pipework of nominal internal diameter greater than 300mm.

6.2 Pressure Testing

Unless otherwise *approved*, pressure testing of water mains must include ferrules, connecting pipes and boundary boxes. Testing must not be undertaken between "live" shut valves. Air must not be used for testing water mains

The water network must be capable of withstanding surge pressures; new pipework must be tested to an internal pressure of not less than 10 bar (102m) or 1½ times the maximum anticipated working pressure ("the test pressure"), whichever is greater.

Unless otherwise *approved* or required by the Council, the pipework to be tested shall be subjected to 5-bar pressure for 24 hours and then to the test pressure sustained for a period of 1 hour in the presence of a representative of the Council.

For Polyethylene pipes testing must be *approved* in advance and be in accordance with the manufacturer's recommendations.

6.3 Chlorination Test

After the pipeline has been pressure tested, cleaned and flushed, it must be disinfected. Unless otherwise *approved*, it must be filled with a chlorine solution having a strength of 20mg/l as a concentrated solution at a rate proportional to

the inflow of water filling the water main, which is to be measured accurately to ensure uniform and correct solution strength.

Following charging of the pipework with the chlorinated solution, the free chlorine residual must be checked at the end furthest from the point of injection. The solution must remain in the pipework for 24hrs and the residual again measured at the end furthest from the point of injection. The sterilisation process must be repeated if the chlorine residual is less than 10mg/l.

The chlorinated water shall be discharged into a foul sewer (never into a surface water sewer or water-course). For pipework of volumes greater than 2 cu.m (c. 250m length of 100mm or 100m length of 150mm pipe) such discharge shall be dechlorinated and subject to the prior **approval** of the Council's Water Pollution Engineer.

6.4 Bacteriological Test

Following sterilisation, the water main shall then be refilled with mains water and tested for bacteriological compliance. A sample must be analyzed at a laboratory which is accredited specifically for bacteriological testing of drinking water by INAB, or *approved* equivalent. It is essential that the sample is taken by laboratory staff or strictly in accordance with the procedures of the laboratory. The "free chlorine residual" at time of sampling must also be recorded. A written report by the laboratory confirming compliance with current EU Drinking Water Directive must be submitted to the Council before final connection.

6.5 Flushing the Water mains

When water mains have been satisfactorily tested and connected to the Council water main, they shall be flushed out with potable water through a standpipe placed on the end hydrant before the water main is brought into use.