

## Qual-PEX Plumbing, Central & Underfloor Heating Pipe

### Tubes et Raccords Rohre und Anschlüsse

NSAI Agrément (Irish Agrément Board) is designated by Government to issue European Technical Approvals.

NSAI Agrément Certificates establish proof that the certified products are '**proper materials**' suitable for their intended use under Irish site conditions, and in accordance with TGD Part D of the second schedule of the **Building Regulations 1997 and subsequent revisions**.



#### PRODUCT DESCRIPTION AND USE:

This Certificate relates to Qual-PEX barrier and non-barrier pipes. Qual-PEX plumbing pipes are manufactured from high density cross-linked polyethylene plastic developed for hot/cold water services, central (radiator) and underfloor heating systems. The barrier pipes have an oxygen barrier layer at mid-wall thickness. Qual-PEX pipes meet the requirements of Class S service conditions specified in Tables 1 & 2 of BS 7291-1:2001 *Thermoplastics pipes and associated fittings for hot and cold water for domestic purposes and heating installations in buildings – General requirements* which covers specifications for both vented and sealed central heating systems. Qual-PEX pipe also meets the requirements of Class 5 service conditions specified in Table 1 of IS EN ISO 15875-1:2003 *Plastics piping systems for hot and cold water installations – Cross-linked polyethylene (PE-X) – General* for a service life of 50 years.

This Certificate certifies compliance with the requirements of the Irish Building Regulations 1997 and subsequent revisions.

#### MANUFACTURE AND MARKETING:

This product is manufactured and marketed by:

Pipelife Ireland Ltd.,  
P.O. Box 29,  
Whites Cross,  
Cork,  
Ireland.  
Tel: +353 (0)21 4884700

## 1.1 ASSESSMENT

In the opinion of the Irish Agrément Board (IAB), the Qual-PEX Plumbing, Central & Underfloor Heating Pipes, when used in accordance with the provisions of this Certificate, are satisfactory for the purpose defined above and can meet the requirements of the Irish Building Regulations as indicated in Section 1.2 of this Certificate.

## 1.2 BUILDING REGULATIONS

### REQUIREMENT:

#### ***Part D – Materials and Workmanship***

**D3** – Qual-PEX Plumbing, Central & Underfloor Heating Pipes, as certified in this Irish Agrément Board (IAB) Certificate, are ‘proper materials’ fit for their intended use (see Part 4 of this certificate).

**D1** – Qual-PEX Plumbing, Central & Underfloor Heating Pipes, used in accordance with this Certificate, can meet the requirements for materials and workmanship.

#### ***Part G – Hygiene***

##### **G1 – Bathrooms and Kitchens in Dwellings**

Hot and cold water systems using Qual-PEX pipe in accordance with this Certificate can meet the current requirements for hot and cold water services.

##### **G2 – Sanitary Conveniences and Washing Facilities**

Hot and cold water systems using Qual-PEX pipe in accordance with this Certificate can meet the current requirements for hot and cold water services.

#### ***Part L – Conservation of Fuel and Energy***

##### **L1 - Conservation of fuel and energy**

Heating and hot water systems using Qual-PEX pipe can meet the current requirements for heating controls and the insulation of pipes and ducts (see Section 4.2 of this Certificate).

## 2.1 PRODUCT DESCRIPTION

Qual-PEX high density pipe is a cross-linked polyethylene plastic plumbing pipe developed for hot and cold water services, central and underfloor heating systems. Qual-PEX pipes meet the requirements of Class S service conditions specified in Tables 1 and 2 of BS 7291-1:2001 which covers specifications for both vented and sealed central heating systems. The pipe comprises a bas cross-linked polyethylene (PEX) pipe, with a wall thickness of between 1.70 and 2.70mm depending on pipe size. Qual-PEX pipe is available in both barrier and non-barrier forms. The barrier pipe has an oxygen barrier which is located centrally in the pipe wall.

The pipes are available in eight sizes as shown in Table 1.

For installations in a solid floor (see Section 2.4 of this Certificate) the base pipe is protected with a minimum screed thickness of 35mm or should be placed in black LDPE conduit pipe.

### Ancillary Items

- Compression fittings to IS EN 1254-3:1998 *Copper and copper alloys – Plumbing fittings – Fittings with compression ends for use with plastics pipes.*
- Standard pipe clips.
- Standard trunking systems.

## 2.2 MANUFACTURE

The cross-linked high density polyethylene pipes are produced by an extrusion process.

### 2.2.1 Quality Control

Continuous quality control is carried out during manufacture, including checks on dimensional accuracy, degree of cross-linking, heat reversion, pressure resistance, thermostability and leak-tightness.

The management systems of Pipelife Ireland Ltd. have been assessed and registered as meeting the requirements of BS EN ISO 9001:2000 *Quality Management Systems – Requirements* by the British Standards Institute (Certification Registration No. FM 00466).

## 2.3 DELIVERY, STORAGE AND MARKING

To maintain Qual-PEX pipe in the best possible condition for use it may be stored either horizontally or vertically but should be stored out of direct sunlight. Pipe lengths or coils should be stored and supported so as to avoid sagging. The pipe should be similarly supported in transit and protected from abrasion and crushing. The pipe is supplied in rolls of 50-100mm depending on pipe diameter. The pipe bears a continuous mark showing the manufacturer's trade mark, nominal pipe size, operating temperature and pressure, manufacturing code, year and week of production. Each coil also shows the manufacturer's name and product description, the IAB identification mark and Certificate number and contains instructions on storage and installation.

## 2.4 INSTALLATION

Installation must be carried out in accordance with the manufacturer's instructions and BS 5955-8:2001 *Plastics pipework (thermoplastic materials) – Specification for the installation of thermoplastic pipes and associated fittings for use in domestic hot and cold water services and heating systems in buildings*, and BS 6700:1997 *Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages*. General installation details are shown in Figures 1 and 2. If a joint beneath the floor is required, a compression fitting complying with the requirements of IS EN 1254-3:1998 must be used for the purpose.

As all plastic materials expand and contract with temperature change, due allowance in pipe runs should be made on installation to accommodate expansion and contraction of the pipe.

Nominal diameter	½"	¾"	1"	10mm	12mm	15mm	22mm	28mm
Outside diameter (mm)	14.63-14.74	20.98-21.09	27.33-27.44	10±0.1	12±0.1	15±0.1	22±0.1	28±0.1
Wall thickness (mm)	1.70±0.1	2.15±0.1	2.70±0.1	1.6±0.1	1.6±0.1	1.6±0.1	2.15±0.1	2.7±0.1
Weight (kg/100m)	6.7	12.3	20.0	4.41	5.12	6.9	12.9	20.4
Standard lengths	6m	6m	6m	-	-	6m	6m	6m
Standard coils	100m	50m	50m	100m	100m	100m	50m	50m
Colour	Beige, white and cream							

Other diameter and lengths available to order

**Table 1: Product Range**



**Figure 1**



**Figure 2**

<b>10mm Qual-PEX</b>	45mm using pipe clips
<b>12mm Qual-PEX</b>	60mm using pipe clips
<b>15mm / ½" Qual-PEX</b>	80mm using angle brackets 175mm using pipe clips
<b>22mm / ¾" Qual-PEX</b>	225mm using pipe clips
<b>28mm / 1" Qual-PEX</b>	300mm using pipe clips

**Table 2: Minimum Bend Radii**

### Cutting

To ensure successful jointing, Qual-PEX pipe ends should be cut smoothly and squarely. This can be achieved with purpose-made pipe secateurs, or copper pipe cutters. A hacksaw may be used but the pipe ends may then need trimming or filing to allow easy insertion of the Qual-PEX pipe support sleeve insert.

### Jointing

A Qual-PEX support sleeve/insert is placed into the pipe. Qual-PEX pipe may be used with an IS EN 1254-3:1998 (Irish size) compression fitting. Place the nut and olive on the outside diameter of the pipe. Push the pipe and olive into the fitting. Screw the nut hand tight to complete the compression joint and hand tighten the nut. The nut is then further tightened three quarters of a turn with the correct size of spanner to complete the compression joint.

### Clipping

Clips should be positioned adjacent to fittings wherever possible, making due allowance for expansion and contraction of the pipework. Where Qual-PEX pipe is to be surface mounted and visible the following clipping distances are recommended:

<b>Clipping Distances (Metric Pipe Sizes)</b>			
Average service temperature	20°C	60°C	80°C
10mm, 12mm, 15mm, ½" Qual-PEX			
- horizontal	500mm	400mm	300mm
- vertical	800mm	600mm	500mm
22mm, ¾" Qual-PEX			
- horizontal	800mm	600mm	500mm
- vertical	1200mm	1000mm	800mm
28mm, 1" Qual-PEX			
- horizontal	800mm	600mm	500mm

**Table 3: Clipping Distances**

Where Qual-PEX pipe is to be boxed-in or installed under floors or in loft spaces etc., clipping distances can be increased or the clips omitted altogether if the pipe is adequately supported by other means.

### Protection

Qual-PEX pipe is a tough material that needs no greater protection from accidental damage when installed than conventional copper. As with copper, Qual-PEX pipe should be sleeved when passing through walls and protected from nails etc. when placed under floorboards or buried under plaster. Qual-PEX pipe is stabilised to withstand limited exposure to ultraviolet radiation or sunlight, but is not designed for permanent direct exposure. Under such conditions painting or lagging is required.

### Installation in a screed

The system should be pressure tested before the concrete screed or sand/cement is laid over the pipe or conduit. Should pressure testing take place in sub-zero temperatures all necessary precautions should be taken to avoid frost damage to the pipes or heating system. Screeds should be laid in accordance with the relevant requirements of BS 8204-1:2003 + A1 2009 *Screeds, bases and in-situ floorings and concrete bases – Sand levelling screeds to receive floorings – Code of practice.*

### Installation in a suspended timber floor

Pipe runs are secured to joists using Qual-PEX pipe clips. The recommended spacing of supports are shown in Table 3.

The pipes are secured on the sides of the joists. Structural timbers should be notched only with the permission of the architect or structural engineer and in accordance with Cl. 13.7.9 of BS 6700:1997. The system should be pressure tested before nailing down the floor deck.

### **Commissioning the system**

When commissioning the system it must be flushed with water, the pump started and residual air removed by opening the bleed valves in each circuit. The system must be checked for leaks after all the air has been removed and before the pipes are covered. As with all plumbing systems care should be taken in the layout of pipe runs to avoid damage from nailing. To minimise the risks of damage associated with nailing through floor decks, the pipe runs should be kept clear of room perimeters and where possible doorways.

### **Boiler connections**

Qual-PEX pipe should not be connected directly to a boiler or similar heat source. It is important to ensure that such a connection is made with a minimum of one metre length of copper pipe. Qual-PEX pipe can be joined to this.

### **Gas pipe**

Qual-PEX pipe should never be used for gas piping.

### **Electrical connections**

Since it is extruded from plastics material, Qual-PEX is an insulator and is NOT suitable for earthing electrical appliances. Alternative arrangements must be made to earth metal items such as sinks, baths etc. as required by the National Rules for Electrical Installations ET 101 (Current version). This is particularly important where refurbishing/extensions are being carried out to existing buildings.

### 3.1 GENERAL

The heating demands for particular rooms are designed in accordance with the CIBSE Guide A: Environmental Design 2015.

To calculate the pressure drop in the pipes connected to each radiator or underfloor heating coil, the total length of the pipe is defined as the sum of the lengths of flow and return pipes from the boiler.

Flow rates for the Qual-PEX pipe are calculated in accordance with BS 6700:1997.

### 3.2 STRUCTURAL DESIGN

Floor constructions should be designed to comply with the relevant technical specifications:

### 3.3 SAFE WORKING TEMPERATURES AND PRESSURES

Qual-PEX pipe meets the requirements for Class 5 service conditions specified in Table 1 of IS EN ISO 15875-1:2003 for a service life of 50 years. These conditions include operating temperatures of 60°C for 25 years operation, 80°C for 10 years and 100°C for 100 hours at a working pressure of 4 bar. The pipe is also suitable for cold water services for a period of 50 years at temperatures of 20°C and an operating pressure of 10 bar.

Qual-PEX pipe was also tested and meets the requirements of Class S service conditions specified in Tables 1 and 2 of BS 7291-1 of 12 bar at 20°C, 4 bar at 92°C, and short term overload temperatures of 114°C.

### 3.4 CHEMICAL RESISTANCE

The material used in the Qual-PEX pipe will not be adversely affected by accidental contact with linseed although these materials should not normally be used in making joints to the pipe.

### 3.5 EFFECT ON WATER QUALITY

Qual-PEX pipe is approved and listed by WRAS (The UK Water Regulations Advisory Scheme) as a product which has passed full tests on the effect on water quality in accordance with BS 6920-1:2001 *Specification for the suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water – Specification*.

### 3.6 FLOW CHARACTERISTICS

The bore of the Qual-PEX pipe is less than copper or steel pipe of the equivalent outside diameter. The consequent reduction in flow rate for a given pressure head should be considered when designing a system – see Tables 4 and 5

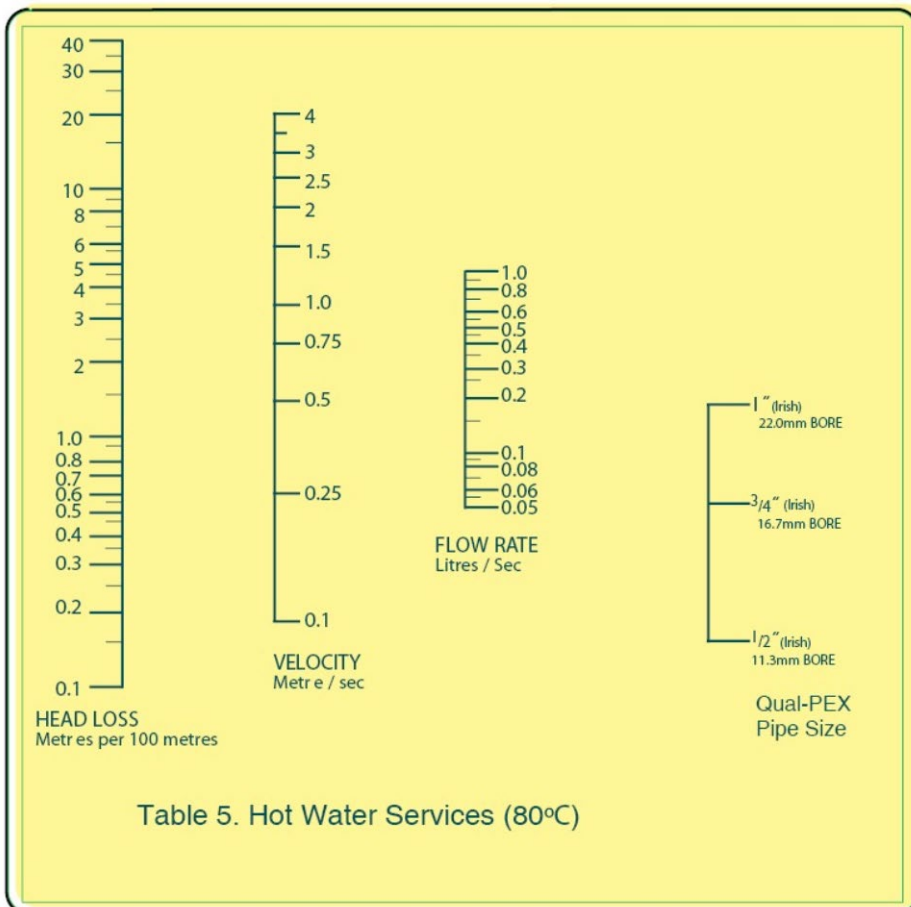
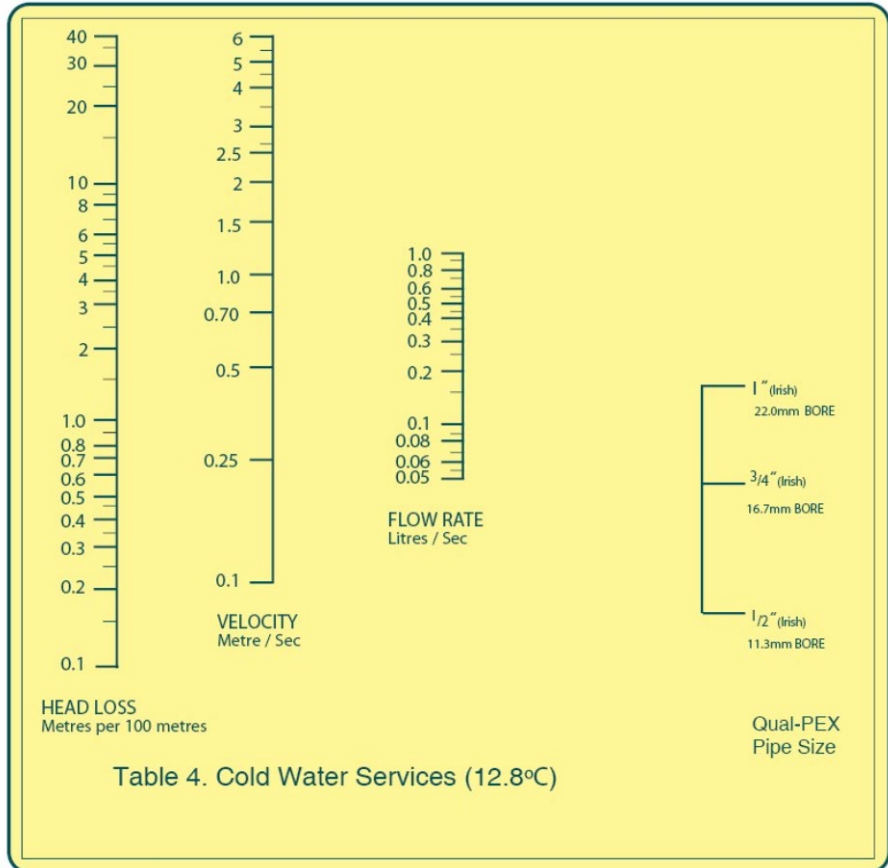
for design flow rates, head losses and velocities for Qual-PEX pipe.

### 3.7 NOTE ON SYSTEM DESIGN

In systems where low water content gas boilers with cast iron heat exchangers are used, Pipelife Ireland recommend that the balancing valve for the hot water circuit be a brass lockshield gate valve (conforming to BS 5154:1991 *Specification for copper alloy globe, globe stop and check, check and gate valves*). This lockshield valve is important so as to prevent the valve being inadvertently turned off while the boiler is on and so avoid the pipework being exposed to excessive temperatures by providing an open circuit for water to circulate between the boiler flow and return.

**Pipe Sizing Method**

1. Start by assuming a particular diameter of Qual-PEX pipe.
2. Draw a straight line from the assumed pipe size through the design flow rate required.
3. Continue this line across the Velocity and Head Loss scales.
4. Check that the head loss does not exceed the permissible loss of head per 100m =  $\frac{\text{Available head} \times 100}{\text{Effective pipe length}}$
5. Ensure that the flow velocity is not too high i.e. maintain flow velocity below 3m/s.
6. If the checks in 4 and 5 are not valid for the pipe size chosen, then choose the next largest diameter of Qual-PEX and repeat steps 1 through 5.



**Notes:**

1. To determine the flow rate that will result from the selected pipe draw a line from the pipe size selected to the permissible loss of head on the left hand Head Loss Axis (see Step 4 in Pipe Sizing Method above for calculation). The flow rate is where this line cuts the Flow Rate Axis.
2. To determine the residual head available in that pipe join the pipe size chosen to the flow rate required using a straight line and continue the line through to the Head Loss Axis. The difference between the permissible loss of head and this mark is the residual head in metres per 100 metres.

#### 4.1 BEHAVIOUR IN FIRE

Where the Qual-PEX pipe passes through an element or structure or cavity barrier the opening should be fire-stopped in a way that will permit thermal movement.

#### 4.2 THERMAL INSULATION

Heating controls and pipe insulation must meet the minimum requirements of TGD to Part L of the Building Regulations. Guidance is given in Section 2-3 of this TGD.

#### 4.3 DURABILITY

The Qual-PEX pipe has been widely used in other European countries for thirteen years. Experience with the system has been favourable. For central and underfloor heating applications, in accordance with good practice, it is recommended that a corrosion inhibitor is used and its concentration checked and maintained.

As with all plumbing and heating systems, the control fittings i.e. thermostatic radiator valves may require replacement within the lifetime of the Qual-PEX pipe.

The Qual-PEX pipe will have a life of at least equivalent to that expected from a traditional installation with metal pipes and fittings.

#### 4.4 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- Dimensional accuracy
- Degree of thermal cycling on pipes and fittings
- Degree of cross-linking
- Long-term hydrostatic pressure resistance of pipe
- Resistance to pull-out of assembled joints
- Short-term hydrostatic pressure resistance of pipes at 20°C
- Short term hydrostatic pressure resistance of pipes at 95°C.

#### 4.5 OTHER INVESTIGATIONS

- (i) Qual-PEX pipe has been tested to and meets the requirements of Class S service conditions as specified in BS 7291-1:2001 which covers specifications for both vented and sealed central heating systems.
- (ii) Existing data on product properties in relation to toxicity with respect to suitability for use with potable water supplies, mechanical strength/stability and durability were assessed.
- (iii) The manufacturing process was examined including the methods adopted for product quality control, and details were obtained of

the quality and composition of the materials used.

- (iv) Site visits were conducted in Ireland to assess the practicability of installation and the history of performance in use of the product.



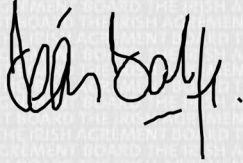
- 5.1** National Standards Authority of Ireland ("NSAI") following consultation with the Irish Agrément Board ("IAB") has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue so long as:
- (a) the specification of the product is unchanged.
  - (b) the Building Regulations and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.
  - (c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.
  - (d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.
  - (e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.
  - (f) the registration and/or surveillance fees due to IAB are paid.
- 5.2** The IAB mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the IAB mark and certification number and must remove them from the products already marked.
- 5.3** In granting Certification, the NSAI makes no representation as to;
- (a) the absence or presence of patent rights subsisting in the product/process; or
  - (b) the legal right of the Certificate holder to market, install or maintain the product/process; or
  - (c) whether individual products have been manufactured or installed by the Certificate holder in accordance with the descriptions and specifications set out in this Certificate.
- 5.4** This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.
- 5.5** Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act. 1989, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.
- 5.6** The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.
- 5.7** Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certification.

## The Irish Agrément Board

This Certificate No. **06/0067** is accordingly granted by the NSAI to **Pipelife Ireland**, on behalf of The Irish Agrément Board.

Date of Issue: **June 2006**

Signed



**Seán Balfe**  
Director of the Irish Agrément Board

Readers may check that the status of this Certificate has not changed by contacting the Irish Agrément Board, NSAI, Glasnevin, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. [www.n Sai.ie](http://www.n Sai.ie)

### Revisions

- **August 2006:** Metric pipe sizes included + Colour range of pipes increased.
- **31 January 2018:** General Revisions
- **16 June 2023:** References to Building Regulations updated