

SecuraOne®

HOT & COLD SYSTEM EVOLUTION

Technical Design Manual

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by aliaxis

Marley began its New Zealand story right back in 1957 trading as a vinyl flooring contractor and retailer in Ponsonby. After a couple of years, we setup shop in Manurewa, Auckland. Here we started manufacturing our vinyl flooring systems locally, before transitioning into the world of PVC and Polyethylene pipe systems focused on quality, innovation, and long-lasting customer relationships.

An iconic Kiwi brand, Marley has grown to become one of New Zealand's largest manufacturers in the plastics industry. Involved with extruded and injection moulded products, Marley manufactures using PVC, Polyethylene and Polybutylene. Belonging to the Aliaxis group has also provided Marley with access to thousands of new products around the world.

Dux Industries became part of Aliaxis in 2006.

Synonymous with Plumbing, Dux is known for a strong focus on innovation and collaboration.

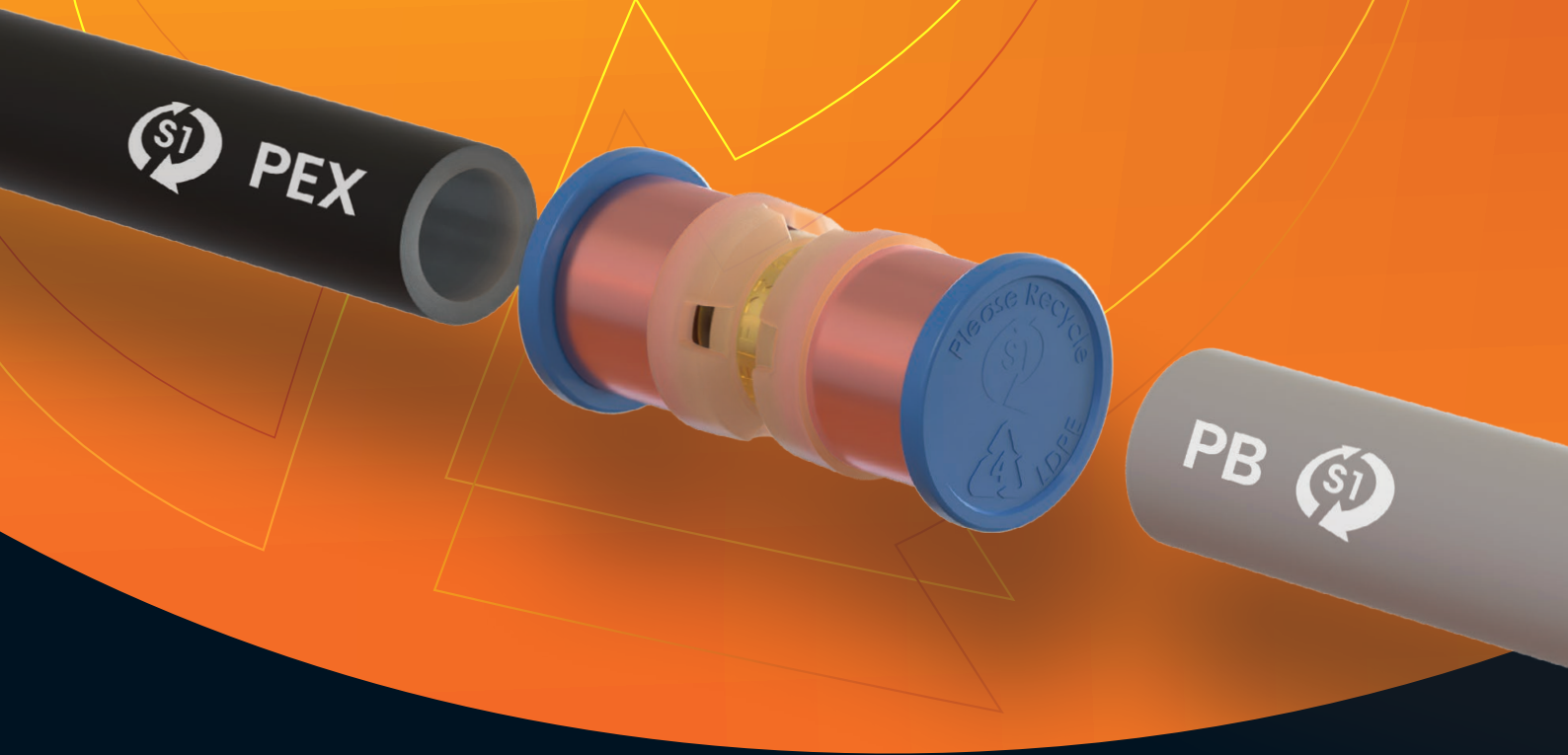
In the early 1990s Dux revolutionized the plumbing market with the SecuraGold® Hot & Cold system. Using Polybutene pipe and solid brass de-zincification resistant, (DZR) fittings the SecuraGold® brand has maintained a strong position in the Hot & Cold potable water systems used in New Zealand.

Stronger  Together

The integration of the Dux business into Marley marks the start of an exciting journey towards achieving our goal of improving the service we provide to all of our customers and ensuring that the business is positioned for future growth.

Secura One

HOT & COLD SYSTEM EVOLUTION



**QUALITY LEAD-FREE
BRASS FITTINGS**



**ENHANCED
FITTING DESIGN**



**TRANSITION FITTINGS
FOR MAINTENANCE JOBS**



**TECHNICAL EXPERTISE
& SERVICE**



**STANDARDISED PB & PEX
PIPE DIMENSIONS**



**EXTENDED RANGE
12MM - 32MM**



**TOP-NOTCH TOOLS
& FREE SERVICING**



**INDEPENDENT
CERTIFICATION**



**25 YEAR
WARRANTY**

The SecuraOne® Hot and Cold System

SecuraOne® is the new hot and cold potable water system supplied by Marley into the New Zealand plumbing market utilising two pipe materials, Polybutene (PB-1) and Crosslinked Polyethylene (PE-Xb), combined with an enhanced solid brass DZR fitting range that has been significantly upgraded to meet the new lead free requirements.

SecuraOne® has been fully designed and developed in New Zealand passing all international third party testing to meet the stringent design criteria set down by the Australian and New Zealand standards authorities. A change to metric sizing has increased the wall dimensions of the PB-1 pipe to an SDR9 rating and allowed for the introduction of a PE-Xb pipe to the range, giving the professional plumber their choice of pipe material but maintaining the solid brass fittings they have come to rely on.

Lead Free

The lead in plumbing product provision within Acceptable Solution G12/AS1 will come into effect on 1 September 2025. From 1 September 2025, any product that contains copper alloy and is intended for use in contact with potable water for human consumption must have a weighted average lead content of no more than 0.25% to comply with G12/AS1.

SecuraOne® meets the compliance requirements of G12/AS1.

SecuraOne® Feature and Benefits

- › One range of fittings – you choose your pipe PB-1 or PE-Xb
- › One set of tools for SecuraOne® PB-1 or SecuraOne® PE-Xb
- › Improved brass fittings – lead free, metric sized and provides greater ease in using the system
- › PE-X pipe is a PE-100 material providing a higher pressure rating equivalent to many SDR7.4 rated pipe
- › Range – 12mm, 16mm, 20mm, 25mm, 32mm
- › Longer barb profiles and additional pipe grip – better pipe to fitting alignment
- › 4 seeing eyelets – be sure of a successful insertion into the fitting
- › Positive locked crimp rings – ensure rings are securely attached to fittings while still being easy to replace
- › Pressure loss calculator online
- › End caps, retaining rings and pipe clips are fully recyclable
- › Packaging made from recycled plastic and is fully recyclable
- › Revit files available
- › 25 year warranty

Approved Applications

The SecuraOne® system is intended for use in residential and light commercial applications for the purpose of delivering water for drinking, cleaning and sanitary requirements.

Using SecuraOne® for anything other than the intended purpose is at the installer's risk, the manufacturer will not be held responsible for damage and/or injury resulting from improper use.

The SecuraOne® system must be installed as per the requirements of this manual, AS/NZS 3500 and local building code requirements.

SecuraOne® is a professional plumbing system and should only be installed by a registered and licenced plumber.

Standards and Certification

The SecuraOne® system complies with the following standards

- › AS/NZS 4020:2018 – Testing of products for use in contact with drinking water

Fittings

16mm to 32mm

- › **Standard:** AS 5082.2-2007 – Polybutylene plumbing pipe systems – Metric Series mechanical jointing systems.
Classification: PN20
- › **Standard:** AS/NZS 2537.2 – Mechanical jointing fittings for use with crosslinked polyethylene (PE-X) for pressure applications.
- › **Application:** Class 2 / 10 bar

12mm only

- › **Standard:** AS/NZS 2642.3:2008 – Mechanical jointing fittings for use with polybutylene (PB) pipes for hot and cold-water applications.
Classification: PN16

Polybutylene Pipes (PB-1 Pipes)

16mm to 32mm

- › **Standard:** AS 5082.1-2007 – Polybutylene plumbing pipe systems – Metric polybutylene (PB) pipes for hot and cold-water applications.
Classification: PN20

12mm only

- › **Standard:** AS/NZS 2642.2 – Polybutylene plumbing pipe systems – Polybutylene (PB) pipes for hot and cold-water applications.
Classification: PN16

Crosslinked Polyethylene Pipes (PE-Xb Pipes)

- › AS 2492:2007 Cross-linked polyethylene (PE-X) pipes for pressure applications.
Classification: PN20

SecuraOne® Fittings

SecuraOne® fittings have been developed to work with both SecuraOne® PB-1 and SecuraOne® PE-X pipes giving you the choice of your preferred piping material.

SecuraOne® fittings in 16mm, 20mm, 25mm and 32mm are compatible with SecuraOne® PB-1 pipes & SecuraOne® PE-X pipes made to metric SDR9 dimensions while 12mm fittings are compatible only with SecuraOne® 12mm PB-1 pipes.

The new range of fittings are made from lead free dezincification resistant brass with annealed copper crimp rings and protective end caps and have a number of new features and benefits to improve installation and performance.

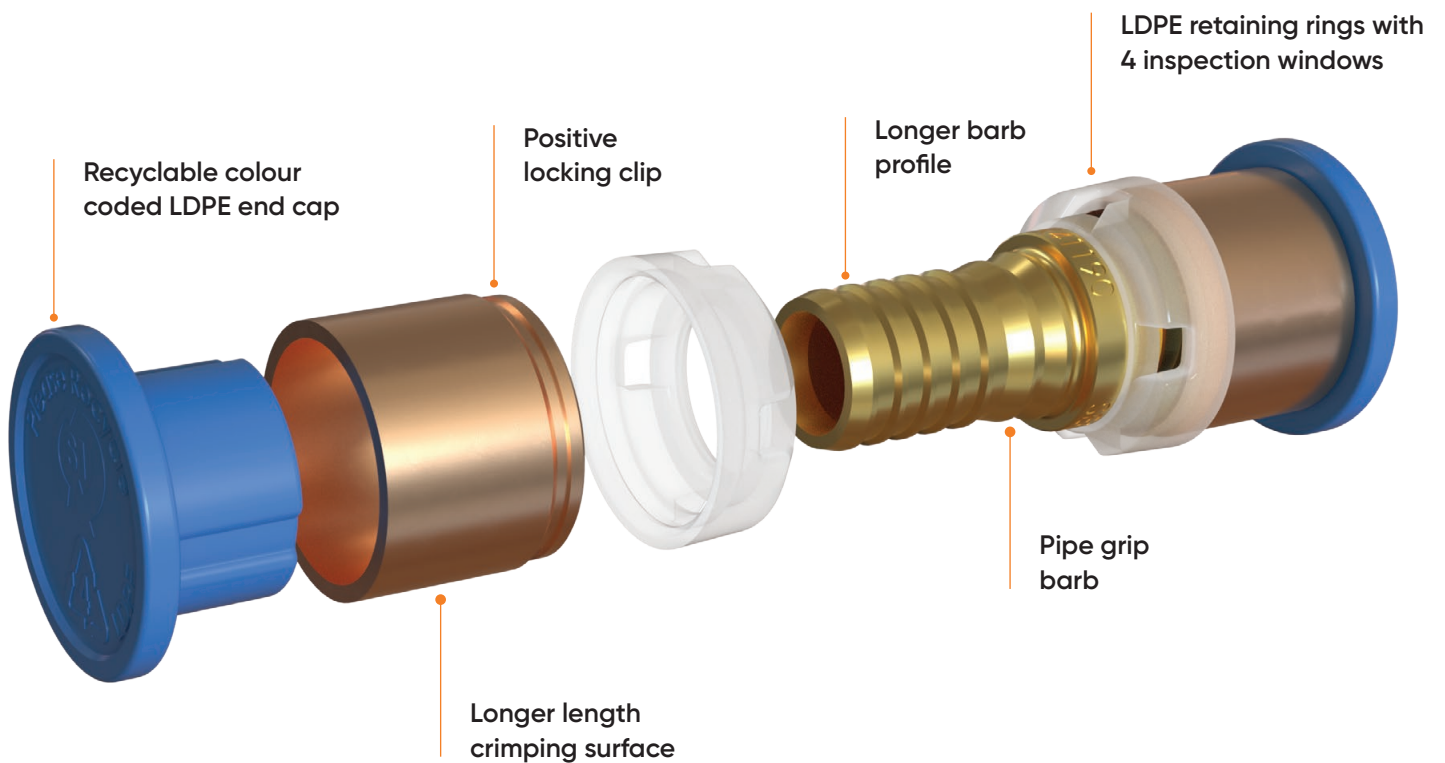
Design

The enhanced fitting design has longer barbs for better pipe to fitting alignment, and with more barbs for better sealing and grip performance, including an additional pipe grip bar to hold the pipe in place while crimping.

The crimp ring positive lock is achieved by the retainer rings, which also have four pipe inspection windows to ensure pipes are fully inserted before crimping. The fittings are made from lead-free de-zincification resistant brass, with annealed copper crimp rings for easy, reliable crimping.

The crimp rings have a positive lock feature, to ensure rings do not fall off while still being easily replaceable if needed. Every secure one fitting comes with protective end caps to ensure the fitting avoids being compromised by damage and dirt.

The end caps are colour coded, to help you easily identify the size.



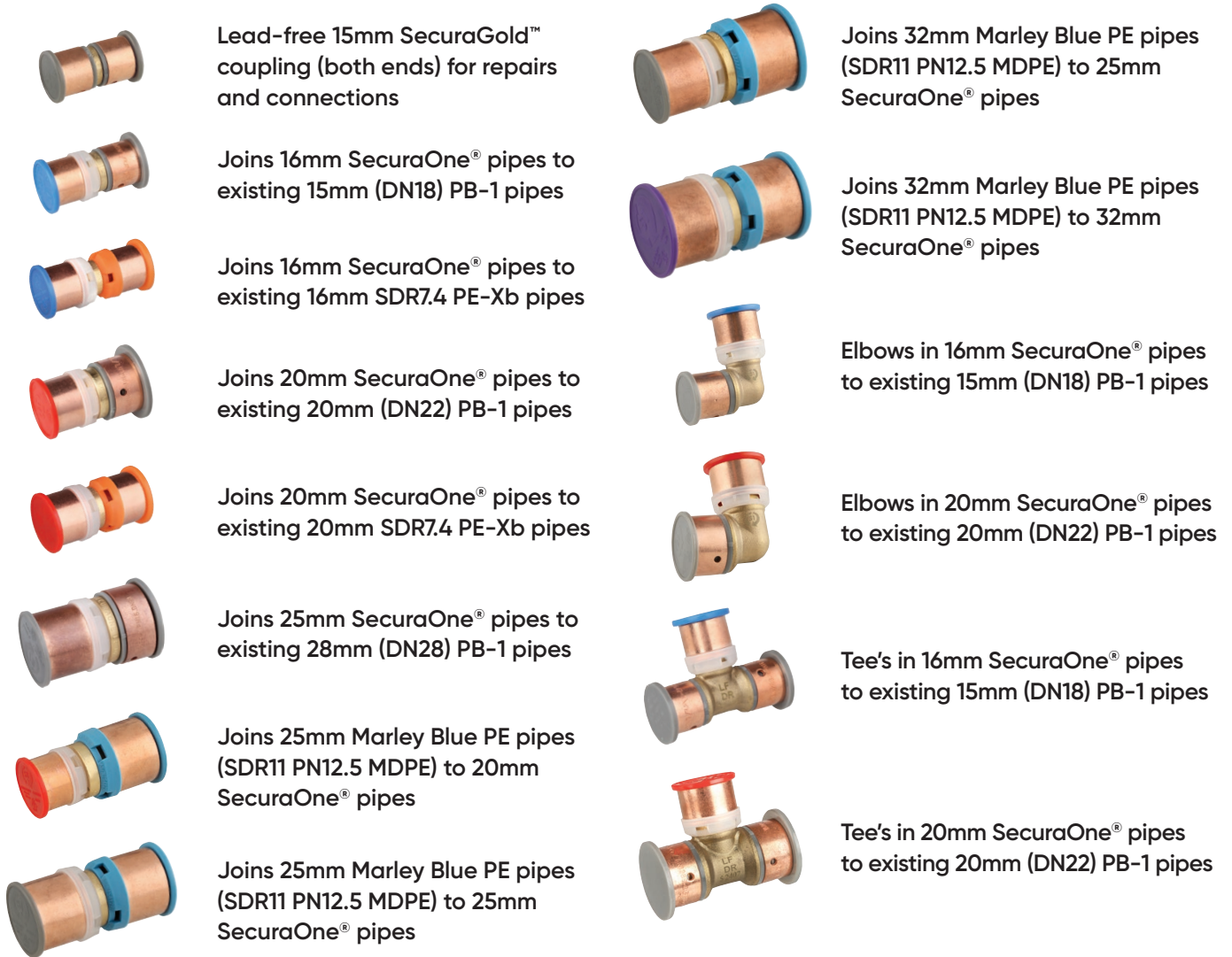
Colour coded

Recyclable end caps to quickly identify fitting size.



Transition Fittings

The SecuraOne® range includes a number of transition fittings developed to adapt the SecuraOne® system to existing PB piping systems made to AS/NZS 2642. Transition fittings are identified by grey retainer rings and a grey end cap on the SecuraGold PB connection end.



SecuraOne® Pipes

The SecuraOne® system offers you the choice of either Polybutene-1 (PB-1) or Crosslinked Polyethylene (PE-Xb) pipes. SecuraOne® PB-1 pipes and PE-Xb pipes are made to the exact same dimensions allowing the use of the same SecuraOne® fitting for both pipe materials.

SecuraOne® PB-1 Pipes (Metric): 16mm, 20mm, 25mm and 32mm

Classification: PN20

The SecuraOne® range of 16mm to 32mm PB-1 pipes are made from the same high-grade material but to new metric dimensions with a standard dimension ratio SDR9 wall thickness. This new configuration maintains and extends all of the existing high-performance characteristics of PB-1 pipes.

Pressure and Temperature

SecuraOne® PB-1 pipes in 16mm, 20mm, 25mm & 32mm sizes are manufactured and certified to comply with the performance requirements of AS 5082.1. Designed to operate with a working pressure of 2000kPa at 20°C and can operate at 70°C with a maximum working pressure of 1270kPa.

Temperature	20°C	60°C	70°C
Pressure (kPa)	2000	1500	1270
Pressure (PSI)	290	217	184

Extended use of temperatures above 70°C can affect the life of the pipe and is not recommended.

The above table represents the working pressures of PN20 PB-1 pipes at various temperatures as per AS 5082.1.

SecuraOne® PB-1 pipes (metric) are available in multiple lengths including 5m straights, 25m lay straight coils and 50m coils.

SecuraOne® PB-1 Pipes (Imperial): 12mm

Classification: PN16

SecuraOne® 12mm PB-1 pipes are continued over from the previous SecuraGold® range and have identical performance characteristics.

Pressure and Temperature

SecuraOne® 12mm PB-1 pipes are manufactured and certified to comply with the performance requirements of AS/NZS 2642.2. Designed to operate with a working pressure of 1600kPa at 20°C and can operate at 70°C with a maximum working pressure of 880kPa.

Temperature	20°C	60°C	70°C
Pressure (kPa)	1600	1050	880
Pressure (PSI)	232	152	127

Extended use of temperatures above 70°C can affect the life of the pipe and is not recommended.

The above table represents the working pressures of 12mm PN16 PB-1 pipes at various temperatures as per AS/NZS 2642.2

SecuraOne® PB-1 pipes are available in multiple lengths including 5m straights, 25m lay straight coils and 50m coils.

SecuraOne® PE-Xb Pipes

Classification: PN20

The SecuraOne® range of 16mm to 32mm PE-X pipes are made using high performance PE-100 raw material and the silane or moisture cure method (PE-Xb). This, with the wall thickness ratio of SDR 9 classifies SecuraOne® PE-X pipes as PE-Xb PE100 PN20 which far exceeds the performance of most available PE-X pipe systems available. Additionally, its performance is equivalent to many SDR 7.4 PE-X pipes but is capable of higher flow rates due to its thinner wall.

Pressure and Temperature

SecuraOne® PE-X pipes in 16mm, 20mm, 25mm & 32mm sizes are manufactured and certified to comply with the performance requirements of AS 2492. Designed to operate with a working pressure of 2000kPa at 20°C and can operate at 70°C with a maximum working pressure of 1000kPa.

Temperature	20°C	60°C	70°C
Pressure (kPa)	2000	1190	1000
Pressure (PSI)	290	172	145

Extended use of temperatures above 70°C can affect the life of the pipe and is not recommended.

The above table represents the working pressures of PN20 PE-X pipes at various temperatures as per AS 2492.

SecuraOne® PE-X pipes are available in multiple lengths including 5m straights, 50m and 100m coils.

PB-1 and PE-Xb Material Properties

Creep Resistance

Creep is the amount of stretch or give in a material under a given load over time, in typical pipe systems internal and external pressure works to stretch, expand, pull and push material away from the point load of a joint or seal. All polyolefin materials tend to creep when exposed to continuous applied stress over a long period of time, this cold flow behaviour can be suppressed by creating a three dimensional network in the polymer structure by either physical or chemical cross linking, as can be found in the manufacture of PE-Xb pipes.

In contrast to other thermoplastics used in hot and cold water applications Polybutene does not require performance modifications via compounding, cross linking or copolymerisation due to its inherently higher levels of resistance to applied stress.

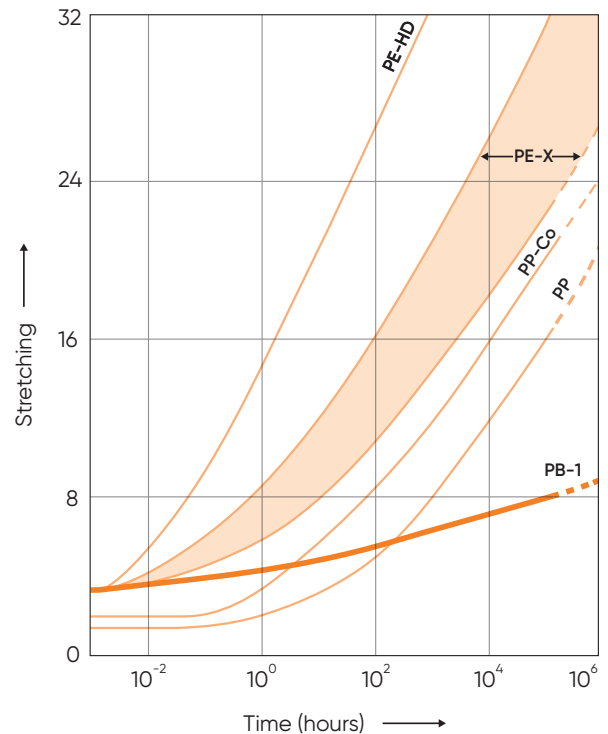
The variation, (expanded orange area) is due to the varying processes used to cross link PE-Xb materials.

PE-Xa – Peroxide Cross Linking

PE-Xb – Silane Cross Linking

PE-Xc – Irradiation Cross linking

Each of these cross-linking processes are open to manufacturing variations which can have a marked effect on how well the cross linking is carried out.



Acoustic Properties

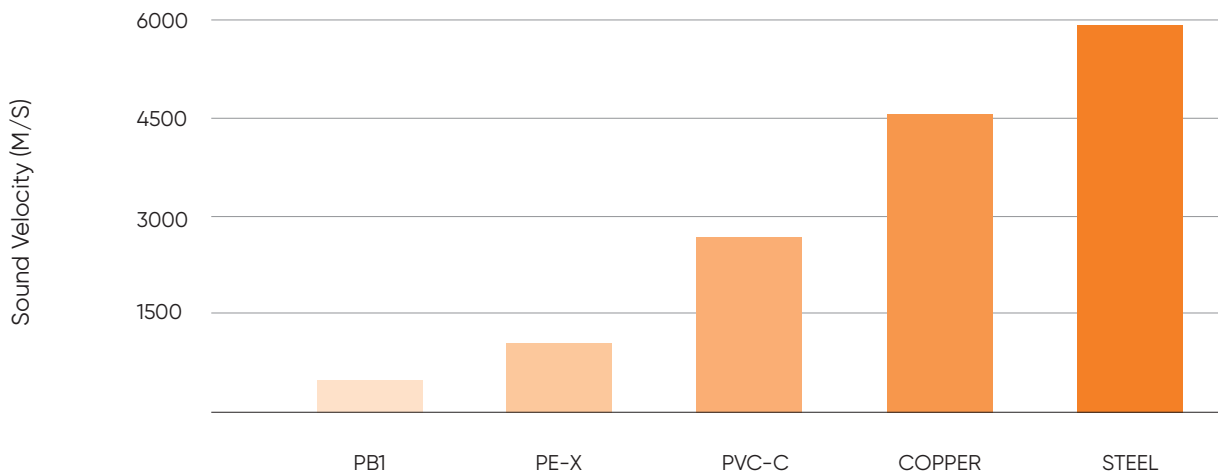
The mechanical noises which accompany the heating and cooling cycles of heating pipe systems made from metals are almost eliminated when plastic piping systems are used. Plastic pipes reduce and muffle the transmission of both mechanical noise and 'water hammer' effects.

For sound conduction through solids, the sound insulation and absorption of the material are important criteria, and this is a function of the density and elasticity of the material.

The acoustic properties of plastics, when plotted over broad ranges of frequencies and temperature, are usually determined by the glass transition temperatures of the particular plastic material.

For materials generally, it is observed that the higher the density, the higher the sound speed. The data presented in the table below clearly shows this relationship for a selection of common plumbing materials.

Sound Velocity of Materials



Approximate values based on E-modulus and density of materials

Design of the installation is critical in ensuring the quiet operation of a plumbing system. To achieve the best results, due consideration should be given to the choice of pipe and fitting materials and the optimum layout of the piping system relative to the building's construction.

PE-Xb has similar properties to PB-1 in that it has a low elastic modulus which allows the material to expand quickly but contract slowly back to its original form, this enables the pipes to absorb relatively well the pressure surges that contribute to water hammer.

Flexibility

Both PB-1 and PE-Xb are flexible materials and can be installed with ease in many situations however care must be taken to ensure that the system is not compromised by stressing the pipes unnecessarily. Correct clip spacing and location are ways to ensure the reduction of stress.

Clipping and supporting the pipes is a crucial aspect to protecting the hot and cold system, in vertical positions the pipe can sag especially on the hot lines, unsupported pipe will exert excessive stresses after the crimp rings which can cause micro stress fractures and eventual failure. Similarly pipe on a horizontal plane will move when appliances are opened and/or closed this movement can if pipe is lying on sharp corners cause the pipe to rub and wear.

To ensure that the pipe is well secured the brackets, clips, and hangars shall be:

- › Formed of material compatible with pipe.
- › Securely attached to the building structure and not to any other service.
- › Designed to withstand the applied loads.
- › Where exposed to a corrosive environment, protected against corrosion.
- › Of like material or lined with a non-abrasive, inert material for that section where contact with the piping may occur.
- › Clamped securely to prevent movement, unless designed to allow for thermal movement.
- › Restrained to prevent lateral movement; and
- › Installed so that no movement can occur while a valve is being operated and so that the weight of the valve is not transferred to the pipe.

Design Considerations

Design Efficiency

There are ways to ensure that a piping system is designed to be as efficient as possible.

Flow Optimisation

Maintaining water pressure suitable for the system you are designing will require planning as the various components of a system can have an adverse effect on the flow rates. Minimise run lengths of pipe as this will help to maintain flow rates, consider the diameter of the pipes, smaller diameters affect flow rates, but they do carry less water per meter, for a hot water system a smaller diameter pipe is more energy efficient.

For cold water runs consider a Ringmain system, this system acts as a pressure vessel maintaining higher pressures at draw off points.

When calculating pipe sizes the velocity of the water should not exceed 3.0 m/sec.

Energy Efficiency

Utilising pipe diameters to increase energy efficiency is an important aspect of pipe installations, the volume of water held within a length of pipe varies per diameter.

NZS 4305 declares in clause 3.2 the developed length of the pipe run from a water heater to the kitchen sink outlet should be minimised and that the total volume of water in the pipe run shall not exceed 2 litres.

The following volumes can be determined in SecuraOne® PB-1 and PE-Xb pipes:

For further calculations the volume per metre/diameter:

SecuraOne® PB and PE-Xb Pipe Volumes (L)					
Length (m)	12mm	16mm	20mm	25mm	32mm
25	1.725	2.825	4.575	7.275	11.925
12	0.828	1.356	2.196	3.492	5.724
7	0.483	0.791	1.281	2.037	3.339

Pipe	Litre Volume/m
12mm	0.069
16mm	0.113
20mm	0.183
25mm	0.291
32mm	0.477

Fitting Efficiency

Minimising fittings is another method to maintain flow rates, consider allowing for larger swept bends where possible rather than adding multiple 90° elbows. The effect of an elbow to reduce the flow rates in a line is not overly significant but when additional fittings and the appliance are added to the line they can cause a significant drop in pressure that will reduce flow efficiency. Typically the pressure reduction of a fitting is shown as a metre allocation of pipe per fitting, for a 16mm elbow we allow a half metre of pipe when calculating pressure drop. This is due to the bore size inside the fitting and the effect of the change of direction on the flow.

Pressure Loss and Flow Rates

SecuraOne® pipes and fittings are designed with efficiencies in mind but will affect the pressure in a system reducing the flow rates gradually as longer lengths and more fittings are used. Understanding these affects allows the designer to minimise the impact on the overall design and maintain the required flow rates to individual fixtures as required by G12/AS1.

The various pipe diameters will have varying affects on the flow rates, water as it flows will cause friction along the walls reducing the flow rate as it passes through longer lengths of pipe. Similarly, each fitting will reduce the flow rate so minimising either of these will help. The below abbreviated Pressure Loss Chart is based on the required flow rates to fixtures as described in G12/AS1.

Marley NZ Metric Pipe – Pressure Loss – Based on NZBC G12/AS1 Flow Rates

Cold Water – 20°

Pressure loss (kPa) based on 6 L/min							
Pipe	1m	5m	10m	15m	20m	25m	30m
12	3.2	16.2	32.4	48.6	64.7	80.9	98.0
16	1.0	5.2	10.3	15.5	20.7	25.9	31.0
20	0.3	1.6	3.2	4.8	6.4	8.0	9.6
25	0.1	0.5	1.1	1.6	2.2	2.7	3.2
32	0.0	0.2	0.3	0.5	0.7	0.8	1.0

Pressure loss (kPa) based on 12 L/min							
Pipe	1m	5m	10m	15m	20m	25m	30m
12	10.9	54.4	108.9	163.3	217.7	272.2	326.6
16	3.5	17.4	34.8	52.2	69.6	86.9	104.3
20	1.1	5.4	10.8	16.2	21.6	27.0	32.3
25	0.4	1.8	3.6	5.4	7.2	9.1	10.9
32	0.1	0.6	1.1	1.7	2.2	2.8	3.4

Pressure loss (kPa) based on 18 L/min							
Pipe	1m	5m	10m	15m	20m	25m	30m
12	22.1	110.7	221.3	332.0	442.7	553.3	664.0
16	7.1	35.4	70.7	106.1	141.4	176.8	212.1
20	2.2	11.0	21.9	32.9	43.8	54.8	65.8
25	0.7	3.7	7.4	11.0	14.7	18.4	22.1
32	0.2	1.1	2.3	3.4	4.5	5.7	6.8

Hot Water – 60°

Pressure loss (kPa) based on 6 L/min							
Pipe	1m	5m	10m	15m	20m	25m	30m
12	2.6	13.2	26.4	39.7	52.9	66.1	79.3
16	0.9	4.2	8.5	12.7	16.9	21.1	25.3
20	0.3	1.3	2.6	3.9	5.2	6.6	7.9
25	0.1	0.4	0.9	1.3	1.8	2.2	2.6
32	0.0	0.1	0.3	0.4	0.5	0.7	0.8

Pressure loss (kPa) based on 12 L/min							
Pipe	1m	5m	10m	15m	20m	25m	30m
12	8.9	44.5	88.9	133.4	177.9	222.3	266.8
16	2.8	14.2	28.4	42.6	56.8	71.0	85.2
20	0.9	4.4	8.8	13.2	17.6	22.0	26.4
25	0.3	1.5	3.0	4.4	5.9	7.4	8.9
32	0.1	0.5	0.9	1.4	1.8	2.3	2.7

Pressure loss (kPa) based on 18 L/min							
Pipe	1m	5m	10m	15m	20m	25m	30m
12	18.1	90.4	180.8	271.2	361.6	452.0	542.4
16	5.8	28.9	57.8	86.6	115.5	144.4	173.3
20	1.8	9.0	17.9	26.9	35.8	44.8	53.7
25	0.6	3.0	6.0	9.0	12.0	15.0	18.0
32	0.2	0.9	1.9	2.8	3.7	4.6	5.6

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L/s to L/min Conversion

Bath	0.3 l/s at 45°C	18 l/min
Sink	0.2 (hot) and 0.2 (cold)	12 l/min
Laundry Tub	0.2 (hot) and 0.2 (cold)	12 l/min
Basin	0.1 at 45°C	6 l/min
Shower	0.1 at 42°C	6 l/min

Notes:

Pressure loss calculated using uninterrupted length of pipe only.

Recommendation:

Typical 500 kPa pressure limited system, pressure loss greater than 150kPa consider raising the diameter of the pipe.

Acceptable Flow Rates to Sanitary Fixtures Paragraph 5.4.1

Sanitary fixture	Flow rate and temperature l/s and °C	How measured
Bath	0.3 at 45°C	Mix hot and cold water to achieve 45°C
Sink	0.2 (hot) and 0.2 (cold)	Flow rates required at both hot and cold taps but not simultaneously
Laundry tub	0.2 (hot) and 0.2 (cold)	Flow rates required at both hot and cold taps but not simultaneously
Basin	0.1 at 45°C	Mix hot and cold water to achieve 45°C
Shower	0.1 at 42°C	Mix hot and cold water to achieve 42°C

Notes:

- The flow rates required by this table shall be capable of being delivered simultaneously to the kitchen sink and one other fixture.
- The temperature in this table are to assist with ensuring acceptable flow rates are achieved when hot and cold water is mixed. Maximum safe water temperatures are given in Paragraph 6.14.1

Chlorine and Chlorine Dioxide

Drinking Water Standards for New Zealand are based on the World Health Organisation guidelines and therefore require a specific mg/l limit for free chlorine in drinking water.

The SecuraOne® system should not be installed in areas where chlorine levels are likely to exceed 4mg/l for prolonged periods. Exposing the system to higher levels for extended periods will be detrimental to the service life of the pipe materials.

Chlorine Dioxide has been shown to be more aggressive towards polyolefins such as polyethylene than other water treatment chemicals, especially at service temperatures above 20°C. Chlorine Dioxide will shorten the service life of polyolefin pipes. For this reason, chlorine dioxide water disinfection should not be used with SecuraOne® pipes, this applies to all distribution, reticulation, and plumbing applications.

Chemical and Corrosion Resistance

PB-1 and PE-Xb materials are inert (not chemically reactive) and cannot contaminate the potable water passing through them, they are also resistant to many chemicals. Full chemical resistance chart for both materials can be found on the Marley NZ website.

Reverse Osmosis, (RO) Water Supply

Reverse osmosis water purification removes all impurities and minerals from the water. As the water is stripped of minerals it can 'steal' minerals from other sources such as pipes or fittings.

Copper is most severely corroded and will leech out into the RO water and while brass is not as severely affected as copper it is still not recommended to use brass in conjunction with RO water.

Hot Water Systems

For Hot Water Cylinder connection details refer to the SecuraOne® Installation Manual.

Instantaneous Water Heaters

Check the manufacturers installation instructions before installing SecuraOne® to ensure compatibility with the appliance.

Recirculating Hot Water Systems

Marley NZ does not recommend using a re-circulating hot water pressure system. The consistent high temperatures and pressures will reduce the service life of the pipe and may cause premature failure.

Expansion and Contraction

Even though the expansion rates of the two materials is similar, it is important to consider:

- › Never pull the pipes tight between fixed points, this can cause excessive stress at the location of joints and possibly cause joint failure
- › Always use proprietary pipe clips supplied as part of the SecuraOne® system, they have been designed to suit the SecuraOne® pipes allowing free movement of the pipe under the clip and never overhit the clip as this will lock up the pipe and cause localised stress
- › When running longer lengths of pipe consider creating expansion bends in the pipe to allow for expansion but ensure it is in a safe area where it cannot rub against hard surfaces
- › Where horizontal lengths in longer hot runs may need to be run in visible areas consider reducing the gap between pipe clips to limit sagging caused by expansion of the pipe.

UV exposure

Long term exposure to UV light will damage polyolefin pipes and cause premature failure.

SecuraOne® pipes exposed to direct or reflective UV light must be protected in a suitable pipe sleeving, conduit, or sufficiently coated with a water-based paint.

Freezing Conditions

SecuraOne® pipes are suitable for installation in areas where freezing conditions are possible but its important to minimise potential issues by using insulation and ensuring pipes and fittings are free to expand and contract. Short pipe lengths between rigidly mounted fittings should be avoided.

Fire and Heat Sources

Avoid installing SecuraOne® near a heat source such as gas flue vents, wetback heating pipes and naked flames, a minimum of 500mm spacing should be maintained.

If it is necessary to braze or solder near SecuraOne® it is important to either move the pipe out of the way or place a good thermal guard to protect the pipe.

Additional Information

The following documents and files can be viewed online at www.marley.co.nz

- › Pressure Loss Charts
- › Fitting Allowance Charts
- › Chemical Resistance Charts
- › Revit Files
- › Safety Data Sheets
- › BPIR Documents

DISCLAIMER: All information contained within this Technical Manual is supplied in good faith and whilst all reasonable care has been taken to ensure the accuracy of the information, this manual should not be used as the sole source of information by the reader/user. Reference material, such as standards, are 'live' documents that are amended from time to time. This may accordingly affect the accuracy of the information, specifications and instructions for installation contained within this Technical Manual. In all cases, the Building Act 2004, the Building Code, all relevant building regulations and standards and local government and government agency requirements (as applicable) must be referred to and complied with. In case of uncertainty, the reader/user should contact Marley NZ Ltd or the local government body for clarification. Marley NZ Ltd has a policy of continual research and development and reserves the right to amend without notice the specification and design of all products illustrated in this Technical Manual. No responsibility can be accepted by Marley NZ Ltd for any error, omissions, or incorrect assumptions.

Sustainable Manufacturing

Marley is committed to creating environmentally sustainable processes and products and was the first plastics manufacturer in New Zealand to achieve ISO14001 registration. We are also Best Environmental Practice certified for our entire range of manufactured uPVC systems. This means we get our raw materials from sustainable and responsible sources, continuously work on our manufacturing processes to reduce our environmental footprint and accept our products back at the end of their useful life for recycling.

BEST ENVIRONMENTAL PRACTICE



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