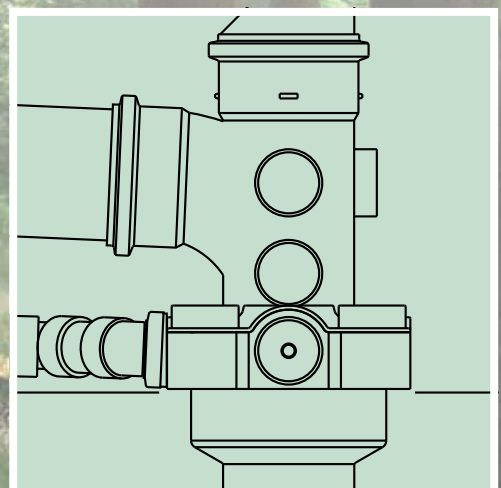




# Soil & Waste

Design & installation



Innovation & Expertise

## Marley Soil & Waste systems

Marley Plumbing & Drainage offer a comprehensive range of soil and waste systems. Available with a variety of jointing methods, Marley products are manufactured to exacting UK and European standards and are designed for use on commercial projects as well as housing developments.

### Product specification information

This guide contains design and installation information for the Marley PVCu soil & waste range. Design and installation guides are also available for Marley Akatherm HDPE drainage and dBlue acoustic soil. Product specification information on all three product ranges is available as a separate document. All documentation can be downloaded from [marley.co.uk](http://marley.co.uk)

### Production information

Information on the complete range of Marley Plumbing and Drainage system solutions is available to download from [marley.co.uk](http://marley.co.uk) or available via the literature hotline 01622 852585.



BS EN ISO 9001:2008  
BS EN ISO 14001:2004



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### Design

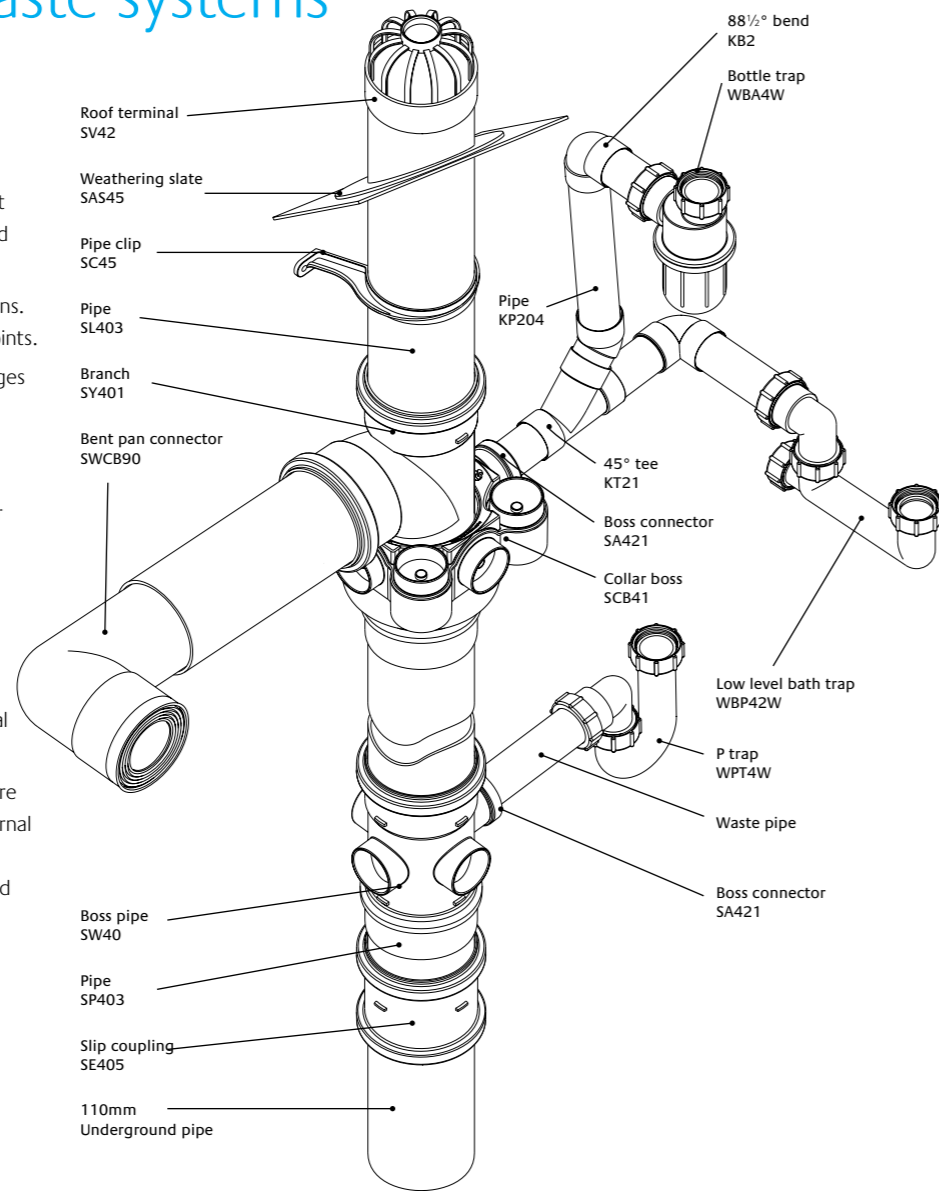
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# PVCu soil & waste systems

- 82, 110 and 160mm push-fit and solvent weld soil systems incorporating socketed and plain ended pipe
- 110mm WC connectors for all BS WC pans. Available with solvent weld or push-fit joints.
- 110mm WC manifold system allows ranges of toilets to be connected horizontally. Ideal for commercial applications.
- 50 and 82mm floor outlet components are available as separate components or as an all in one trapped floor outlet.
- Fire sleeves and pipe wraps, providing up to 4 hours rating.
- 110 and 160mm pipe support components designed specifically to meet the needs of supporting horizontal or vertical suspended PVCu pipework.
- 82, 110 and 160mm pipes and fittings are also suitable for use as internal and external rainwater pipes to drain flat roofs and metal gutter systems on commercial and industrial buildings.



# Commercial applications



## Marley Akatherm HDPE

The Marley Akatherm HDPE drainage range is certified to BS EN 1519: 2000 (licence number KM 545820) An extension of the Marley soil & waste portfolio, the HDPE range offers an alternative solution to cast iron.

It is particularly suited for commercial applications or where a product with high impact or abrasion resistance is required, such as hospitals, hotels, schools, as well as residential buildings. HDPE will also cope with temperature variations of -40°C to 100°C.

The combination of the excellent material properties of HDPE with homogenous welded joints provides greater installation flexibility with a wide range of jointing options



## Key fitting: Akavent aerator

The need for secondary venting in high-rise buildings can be eliminated with the Akavent aerator. An Akavent aerator fitting breaks the fall on each floor and as a consequence the secondary vent pipe is not required as the pressure difference stays well within the limit of 3 mbar.

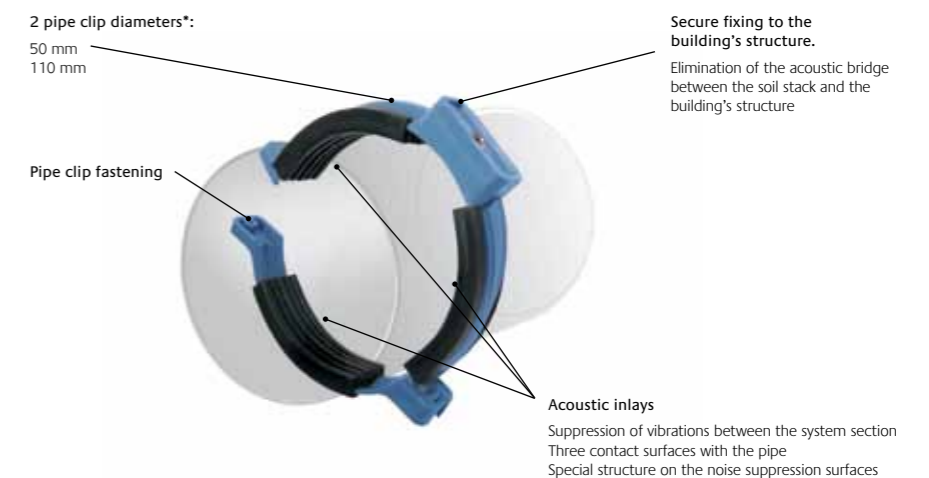
The unique shape of the fitting increases the capacity of the stack. The soil and waste flow from the higher floors smoothly converges with the flow of the lower floor.

## Marley dBlue acoustic system

The Marley dBlue acoustic system is a triple-layer drainage system designed for use where improved levels of soundproofing are required. Suitable for use in domestic applications as well as hospitals and hotels, where reduced noise levels are required. Used in conjunction with the acoustic pipe clips, the dBlue system is designed to reduce noise and acoustic vibrations to a level of 19dB at 4 l/s discharge rate. It is also lightweight, resistant to temperature change and is jointed using the push-fit ring seal method.

The dBlue system is available in 40mm, 50mm, 110mm and 160mm diameters. It is also compatible with the Marley PVCu soil and waste system for branch connections.

\*40 mm and 160 mm pipe clips also available.



## Solvent soil

The Marley PVCu soil range has been extended with the addition of nine new 110mm solvent fittings, offering further options for the installer. The range includes the new 8-way soil manifold which offers

the flexibility of 4 top and 4 side entries, allowing for multiple inlet connections. At just 70mm above the floor slab, the manifold sits neatly at finished floor level in most typical applications.

	Solvent waste	Push-fit waste	Compression waste	Overflow	Traps
PVCc	ABS	Polypropylene	Polypropylene	PVCu	Polypropylene
Suitable for internal and external applications.	Lightweight and cost effective for internal installation. Easy to cut joint and install.	For internal use, ideally suited to fast installation. Cost effective solution where systems are being installed or modified.	Multi-fit compression socket, for internal use. Easy installation to similar sized new or existing plastic and copper pipework.	A complete range of pipework and fittings for overflow applications.	A range of traps, which enable quick & easy installation to any new or existing plastic or copper pipework.
Available in 32, 40 and 50 mm	Available in 32, 40 and 50 mm	Available in 32, 40 mm	Available in 32, 40 mm	Available in 21.5 mm	Available in 32, 40 and 50 mm
White, Black & Brown	White, Black & Grey	White, Black & Grey	White & Chrome	White	White & Chrome

ABS and polypropylene waste pipes and fittings are designed for internal use and should not be fitted externally as they will be subject to ultraviolet light degradation. If fitted externally it is recommended that they are protected by the application of a suitable paint or are boxed in.

The Marley soil & waste range offers an extensive choice of standard fittings for commercial and domestic projects.

Pictured is a selection of key components within the range. Product specification information on the PVCu, HDPE drainage and dBlue acoustic soil ranges is available as a separate document. All documentation can be downloaded from [marley.co.uk](http://marley.co.uk)

### 8-way collar boss

The collar boss offers the flexibility of 4 top and 4 side entries, allowing multiple inlet connections. Specifically designed to prevent cross-flow and to allow multiple low level bath or shower waste pipes to be connected to the stack above floor level.



### Adjustable bends

Available in 82, 110 and 160mm and can be adjusted by cutting the fitting at the required angle and solvent welding the two sections together.

Code	Angle achieved
SB37	11° – 87½°
SB46	5° – 14°
SB47	21° – 90°
SB67	15° – 90°



### 5 boss branch, 87½° push-fit sockets/spigot

The Marley range of five boss branches are designed to allow multiple waste pipe connections to be made to the discharge stack from different directions. Four different side entry combinations are possible together with a rear, if required.



### Fire protection systems – Universal fire collar (UFC1) & fire sleeves

Fire sleeves and pipe wraps, providing up to 4 hours rating. The universal fire collar is designed to be surface mounted and is sufficient for 5 x 110mm pipe collars.



### WC connectors

Connectors for all BS WC pans to accommodate a range of outlet sizes between 84 and 110mm. Available with solvent weld or push-fit joints.



### Durgo air admittance valve

The Durgo valve is designed to reduce the number of roof penetrations. Suitable for use in sanitary pipework systems up to ten storeys high, the valve must be fitted in a vertical position above the flood level of the highest appliance connecting to the stack.



### Manifold system

For use in sanitary pipework systems in schools, hospitals, public and commercial buildings, the manifold system allows ranges of toilets to be connected to a horizontal float above floor level and eliminates the need for specially fabricated fittings.



### Anti-syphon bottle trap (WBA3W & WBA4W)

Developed to prevent self-syphonage from basins, which can occur particularly where the waste pipe drops vertically from the appliance. Non-mechanical, the trap operates as air is drawn in through a central by-pass tube to ensure the trap seal is maintained.



## PVCu Soil – Push-fit or solvent weld

### Push-fit soil range

The Marley range offers a quick, straightforward solution. In up to three colour variants, pipe with a socket or spigot end and a wide range of fittings. Ideally suited for domestic and small commercial applications.



### Solvent Soil range

The Marley range offers a secure method of jointing and includes the new eight-way collar boss for multiple connections to the stack, solvent socket bends, branches and access fittings. Ideally suited for commercial and horizontal pipework situations.



## Sanitary pipework design

All sanitary pipework systems should be designed to satisfy the following regulations and standards where applicable.

- The Building Regulations 2010: Approved Document H, Section 1.
- The Building Standards Technical Handbook (Scotland) 2010: Part M.
- The Building Regulations (Northern Ireland) 2000, Technical Handbook N.
- BS EN 12056: 2000, Parts 1 to 5.

Regular consultation is essential between Architects and Plumbing Engineers throughout the building design stage as the careful arrangement of kitchen and bathroom appliances will simplify the final sanitary pipework layout. This will help to ensure that an efficient sanitary pipework system is installed at minimum cost.

The design information provided in this catalogue is endorsed in the above publications and while every effort has been made to ensure accuracy, no responsibility can be accepted for errors or omissions. For detailed guidance please consult the relevant documents referred to above.

## Methods of jointing

While the principal method of jointing 82, 110 and 160mm pipes and fittings is push-fit, many components in the range are also available with sockets that allow for solvent weld jointing. This particular technique is widely used on smaller diameter waste and overflow pipework although expansion and copper adaptor couplings include a push-fit joint to allow for thermal movement.

As polypropylene cannot be solvent welded, the push-fit method of jointing is used throughout the system.

## Thermal movement

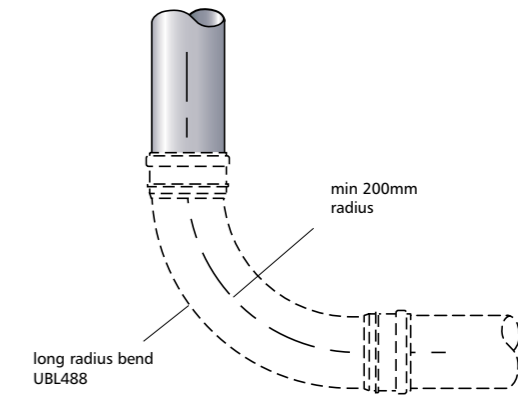
The coefficient of linear expansion for PVCu is 0.06mm/m/°C. As a result a 3m length of pipe will increase in length by approximately 3.6mm when subjected to a 20°C temperature variation. Therefore, it is important to ensure that any movement is controlled and push-fit joints are installed to accommodate any expansion that may occur due to increases in ambient temperature or hot water discharges.



## Bends at the base of stacks

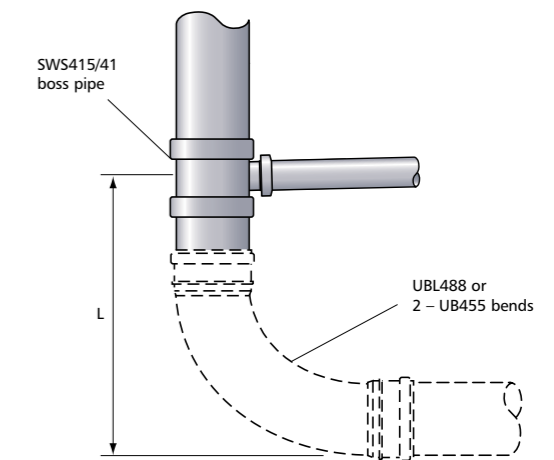
Bends at the base of vertical stacks should be of long radius and have a minimum centre line radius of 200mm on a 110mm nominal size stack. Two 45° radius bends may also be used as an alternative to provide the change of direction and connection to the building drain. The same design principle should also be adopted where offsets occur in stacks of one or more storey height.

Where pipework is suspended in a ceiling void or car park, it is recommended that two 45° solvent weld bends are used with a short piece of pipe between to ensure the radius exceeds that required.



## Branches at the base of stacks

For single dwellings up to three storeys high, the distance between the centre line of the lowest branch connection and the invert of the drain should be at least 450mm. For multi-storey systems up to five storeys high, the minimum distance should be 740mm and for systems higher than five floors no connections are permissible at ground floor level. Where this occurs a separate stub stack should be provided to serve the ground floor or individual appliances should have their own separate connection to the building drain.



L = 450mm up to three storeys high  
L = 740mm up to five storeys high  
L = one storey height, over five storeys

## Sizing of soil stacks

It is recommended that the guidance given within BS EN 12056, part 2 be adopted when sizing soil stacks. Marley Technical Services Department offer design and installation advice, including the sizing of soil stacks, for customers who use or specify Marley Plumbing & Drainage products.

## Soil stack capacity

The capacity of a soil stack can be increased by the installation of a secondary ventilated stack. The following information is taken from tables 11 & 12 of BS EN 12056-2: 2000 which illustrates this increase.

### Primary ventilated stack

Stack size (mm)	Maximum capacity (l/s) Swept entries
82	2.6
110	5.2
160	12.4

### Secondary ventilated stack

Stack size (mm)	Secondary vent (mm)	Maximum capacity (l/s) Swept entries
82	50	3.4
110	50	7.3
160	80	18.3



Secondary ventilated stack

## Material and manufacture

Marley Plumbing & Drainage pipes and fittings for domestic sanitary pipework systems are manufactured from different plastics materials including PVCu, PVCc, ABS and Polypropylene.

The table right details the important dimensions and weights of each of the systems together with the relevant British and European Standard. All pipes are manufactured using a continuous extrusion process and fittings are produced by high-pressure injection moulding.

## Chemical and temperature resistance

Most plastics used for sanitary pipework are highly resistant to those chemicals normally found in domestic waste water and sewerage systems. Applications where chemicals and higher temperature discharges are likely to occur, the Marley Akatherm HDPE drainage range may be more suitable.

Generally the maximum working temperature of Marley soil and waste systems when subjected to continuous flow is 70°C and 75°C respectively. Higher intermittent discharges of up to 95°C may be accommodated provided the period of discharge does not exceed two minutes duration.

Alternatively, reference can be made to ISO publications TR10358 & TR7620 which provide comprehensive information on chemical and temperature resistance of plastics and rubber materials.

## Dimensions and weights

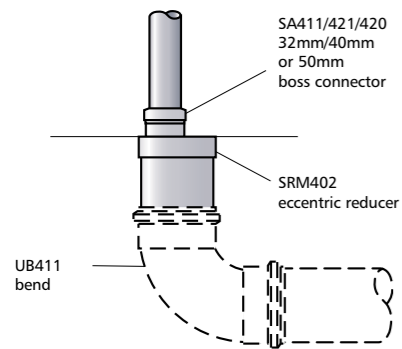
Pipe Material Standard	BS nominal size (mm/ inch)	Min	Max	Wall thickness (mm) Min	Weight kg/metre
<b>Soil PVCu</b>					
BS 4514	82	82.4	82.8	3.20	1.30
BS EN 1329	110	110.0	110.3	3.20	1.70
	160	160.0	160.4	3.20	2.50
<b>Waste</b>					
PVC-c	32/1¼	32.00	32.30	1.80	0.33
BS EN 1566	40/1½	40.00	40.30	1.80	0.41
	50/2	50.00	50.30	1.80	0.57
<b>Waste</b>					
ABS	32/1¼	36.15	36.45	1.80	0.20
BS EN 1455-1	40/1½	42.75	43.05	1.80	0.26
	50/2	55.75	56.05	1.80	0.35
<b>Waste</b>					
Polypropylene	32/1¼	32.00	32.30	1.80	0.21
BS EN 1451	40/1½	40.00	40.30	1.80	0.26
<b>Overflow</b>					
PVCu	21.5¾	21.55	21.70	1.10	0.11
BS EN 806-4					

## Offsets in stacks

Offsets in the wet portion of a discharge stack should be avoided wherever possible but where they have to be fitted a large radius or two 45° bends should be used to create each change of direction. Offsets in lightly loaded stacks up to three storeys high do not require offset venting but on multi-storey buildings this may be necessary depending on the loading of the stack and the numbers of floors above the offset. The principles previously described for bends and branches at the base of a stack should also be applied.

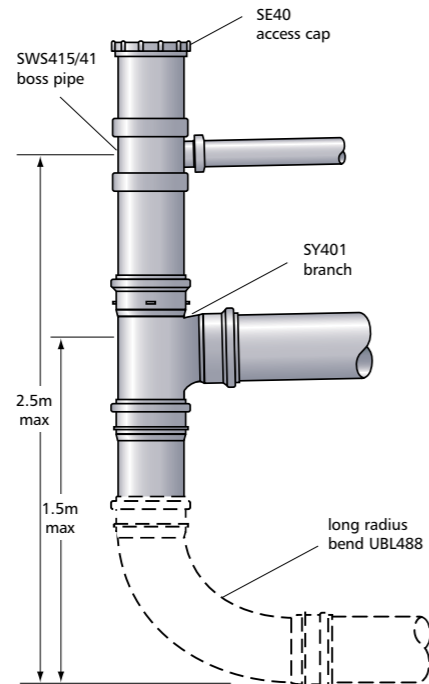
## Stub waste

This technique is often used to connect isolated ground floor waste appliances such as basins, baths, shower trays and sinks to eliminate exposed pipework or low level ducting. The 110mm unventilated PVCu drain is terminated at finished floor level with a reducer and boss adaptor to suit the size of waste from the appliance.

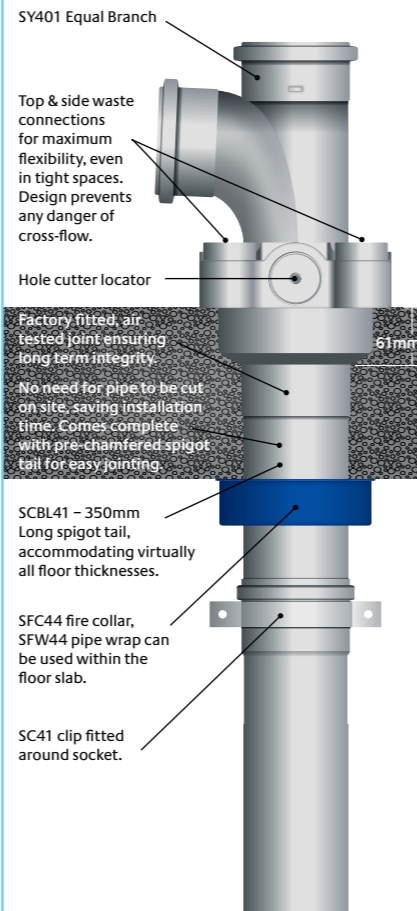


## Stub stacks

An unventilated stub stack terminated with an access fitting may be used to connect a group of ground floor appliances to the building drain provided the vertical drop to the invert level of the drain does not exceed 1.5m from a WC and 2.5m from a waste appliance. Where one or more stub stacks are connected to the same drain, the head of the run should be ventilated to atmosphere or air admittance valves fitted to each stub stack arrangement.



## 8-way collar boss



## Branch pipe gradients

The gradient of a branch pipe should be uniform and adequate to drain the pipe and appliance efficiently. A minimum gradient of 18mm/metre should be adopted for 32, 40 and 50mm nominal size pipes but larger diameter 82, 110 and 160mm branch runs may be laid flatter at 9mm/metre fall where the discharge flow rate exceeds 2.5litres/second.

## Branch pipe lengths

The following information is taken from Table 8 of BS EN 12056: 2: 2000 and provides general guidance on the recommended lengths of unventilated branch pipes for a variety of sanitary appliances.

Appliances	Dia (mm)	Min.trap seal depth (mm)	Max. length of pipe (m)	Pipe gradient (%)	Max. bends (No.)	Max. drop H (m)
Washbasin or bidet	32	75	1.7	2.2	0	0
Washbasin or bidet	40	75	3.0	1.8 to 4.4	2	0
Bath or shower	40	50	No limit	1.8 to 9.0	No limit	1.5
Bowl urinal	40	75	3.0	1.8 to 9.0	No limit	1.5
Trough urinal	50	75	3.0	1.8 to 9.0	No limit	1.5
Kitchen sink	40	75	No limit	1.8 to 9.0	No limit	1.5
Dishwasher or washing machine	40	75	3.0	1.8 to 4.4	No limit	1.5
WC	110	50	No limit	1.8 min	No limit	1.5

The maximum lengths given above may be increased where the branch pipe is ventilated or an air admittance valve is used. For further details refer to the above standard.

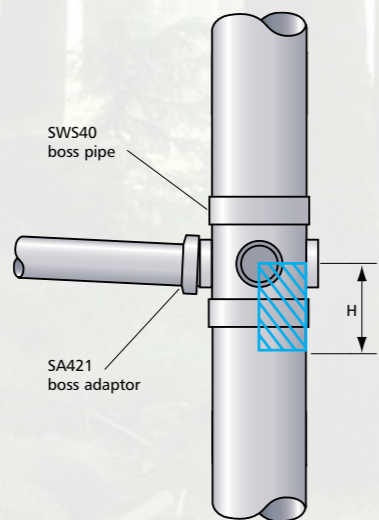


## Prevention of cross-flow

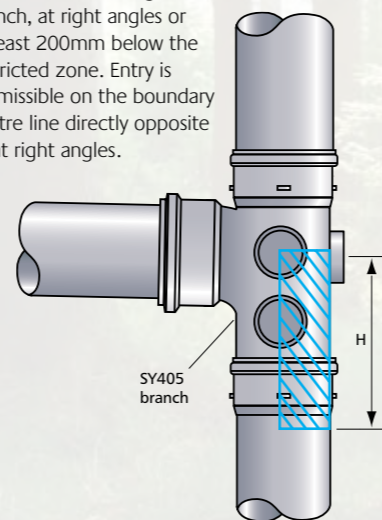
Where small diameter branch waste pipes connect to a discharge stack they must be arranged to eliminate the risk of cross-flow from one branch to the other. A branch creates a no entry zone for opposing waste connections, which varies depending on the stack diameter. No connections should be made within the restricted zone although entry is permissible on the centre line of the boundary directly opposite or at right angles.

Stack size (mm)	Height of zone 'H' (mm)
82	90
110	110
160	250

'H' = 200mm irrespective of stack diameter

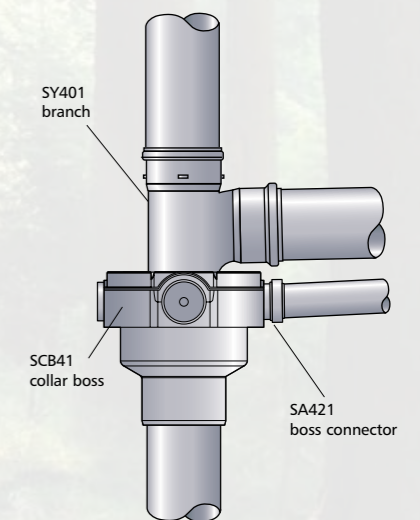


To prevent cross-flow from a large diameter branch to a smaller waste connection, the latter should be made to the stack at or above the centre line of the larger branch, at right angles or at least 200mm below the restricted zone. Entry is permissible on the boundary centre line directly opposite or at right angles.



The **Marley Collar Boss** was specifically designed to overcome installation problems imposed by the 200mm restricted zone and to allow multiple low level bath or shower waste pipes to be connected to the stack above floor level. Cross-flow is prevented as the circular annular chamber protects the small diameter waste connections from the WC discharge allowing waste water to flow freely and merge below the critical zone.

Different combinations of 110mm branches can be used with the collar boss to accommodate various WC positions which may be up to 3 metres from the vertical stack.



## Combined branch waste

A combined branch waste is often used to connect a bath and/or shower and basin to the discharge stack as this allows waste pipework to be neatly concealed in a low level duct.

Where this technique is adopted a 45° entry tee must be used to ensure the basin discharge is swept in the direction of flow towards the stack. The minimum distance between the bath or shower and basin connection should not be less than 500mm and it is recommended that an anti-syphon bottle trap is fitted to the basin or a vent provided to protect the appliance from self-syphonage.

It is recommended that the distance of the combined waste does not exceed 3 metres, however, experience has shown that longer runs using 40 or 50mm pipework has proved successful provided adequate fall can be obtained to ensure self-cleansing velocity is maintained

## Waste traps

Generally appliances such as sinks, baths and showers do not suffer from self-syphonage as the trap seal is replenished at the end of the discharge due to the flat bottom design of the appliance. Tubular traps are recommended for such appliances as they ensure unrestricted discharge and reduce the risk of blockage and prevent the accumulation of sediment.

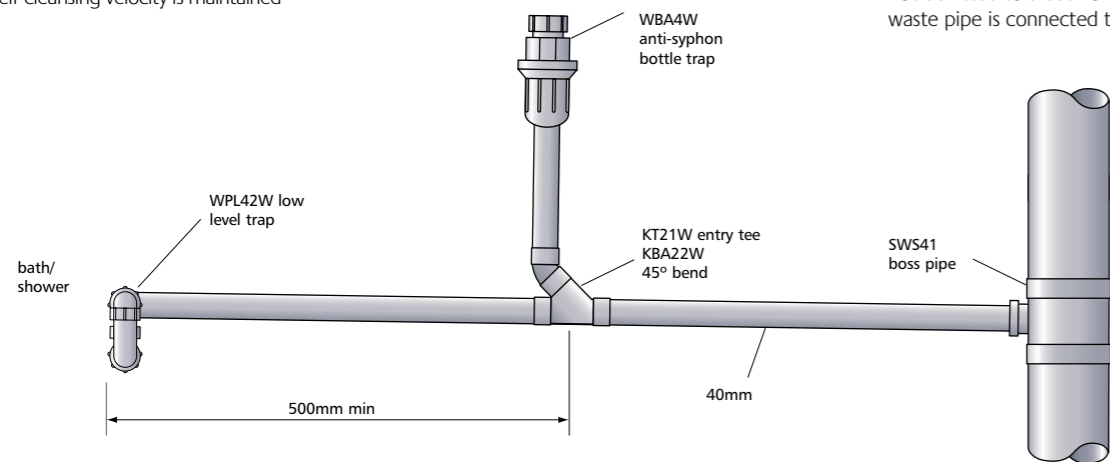
- Compression jointed polypropylene traps can be taken apart to remove a blockage or gain access to the waste system
- Range includes P-traps, S-traps, bottle traps, bath & shower traps and different configurations for washing machines, dishwashers, 1½ or 2 bowl sinks
- White with 50 or 75mm seal depths
- Sizes: 32, 40 and 50mm

The **Marley anti-syphon bottle trap**, WBA3W/WBA4W, was specially developed to prevent self-syphonage from basins, which can occur particularly where the waste pipe drops vertically from the appliance before falling at an even gradient to the discharge stack.

The trap also eliminates the need for a secondary vent pipe where basins are located further than the recommended 3m maximum from the stack. Non-mechanical, the trap operates as air is drawn in through a central by-pass tube to eliminate any syphonic action and ensure the trap seal is maintained.

The WSB4W shallow trap has a 20mm water seal and is supplied to satisfy customer demand.

It is recommended its use is restricted to ground floor baths and showers that discharge directly to an external trapped gully. It should not be fitted to a bath or shower where the waste pipe is connected to a soil stack.



## WC manifold system

Developed for use in sanitary pipework systems in schools, hospitals, public and commercial buildings, the manifold system allows ranges of toilets to be connected to a horizontal float above floor level and eliminate the need for specially fabricated fittings.

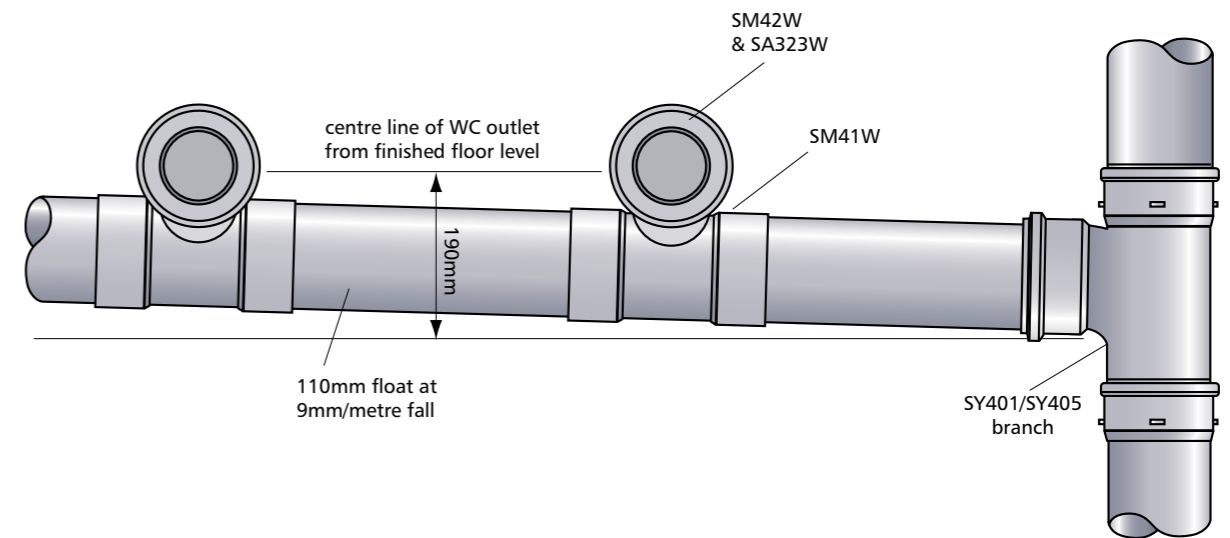
The components are suitable for installation in a duct, or for fitting on the surface of the wall directly behind the pan. Where the manifold is fitted directly behind the range of toilets,

the minimum distance between the end of the WC spigot and the face of the wall is 150mm. To facilitate varying angles and gradients the 110 x 90mm manifold branch has a radial socket to match both options of adjustable WC bend. When the selected bend is cut to the appropriate line and solvent welded into the socket on the manifold branch a uniform fall is obtained between each toilet on the horizontal float.

To accommodate different dimensions between the WC spigot and horizontal float, the adjustable spigot bend SM43W may be trimmed by up to 35mm or the extension pipe SM45W can be used with the pan connector SM44W and SA323W cap & seal.

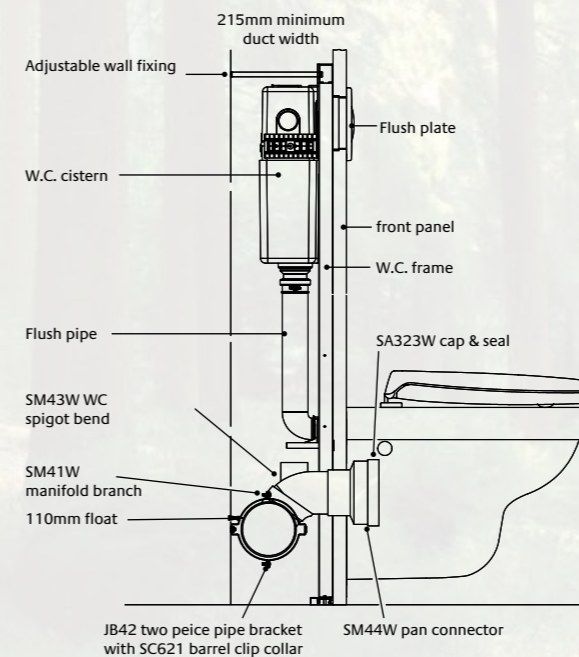
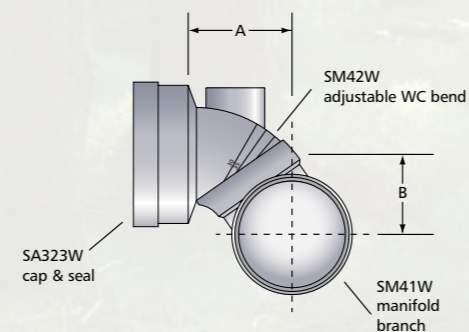
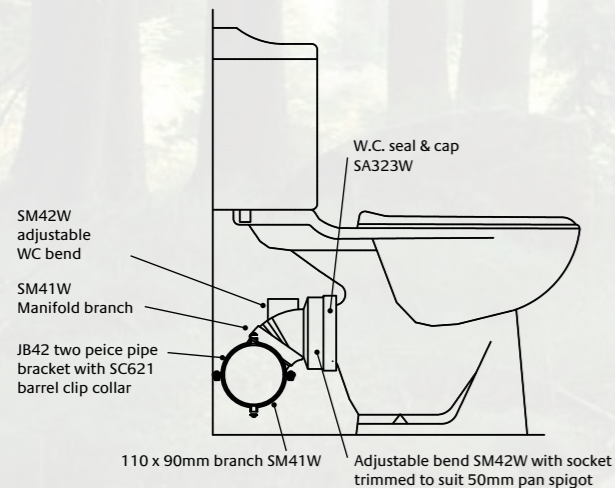
The WC socket on both the SM42W and SM44W must be trimmed to suit the length of pan spigot before the SA323W is fitted.

For installation details see page 18.



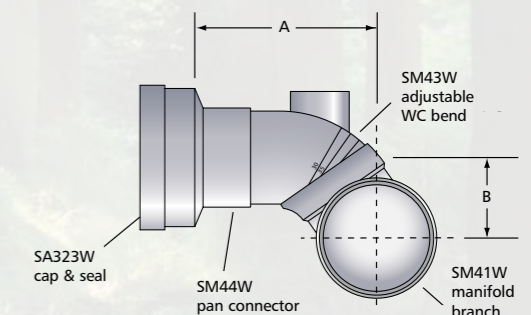
Manifold branch SM41W with SM42W

Cut line	50°	55°	60°	65°	70°	75°	80°	85°	90°
A - projection (mm)	93	93	92	91	90	87	84	80	75
B - drop (mm)	69	77	85	93	101	109	116	123	130



Manifold branch SM41W with SM43W

Cut line	50°	55°	60°	65°	70°	75°	80°	85°	90°
A - projection (mm)	180	180	179	178	177	174	171	167	162
B - drop (mm)	69	77	85	93	101	109	116	123	130



## Durgo air admittance valve

The Durgo valve is designed to reduce the number of ventilating pipes and subsequent roof penetrations in domestic, commercial and public buildings. Suitable for use in sanitary pipework systems up to ten storeys high, the valve must be fitted in a vertical position above the flood level of the highest appliance connecting to the stack. Valves should be installed within the building in a ventilated duct or roof space where there is no risk of freezing and must be accessible for inspection and testing.

The 50, 82 and 110mm size valves have been assessed by the British Board of Agrément and awarded Certificate No 06/4325 which permits their use in accordance with the Building Regulations. A copy of the full certificate is available and provides comprehensive information on their use and installation.

When installed the valve will remain closed unless the system is subject to negative pressure whereby the diaphragm will lift and allow air to be drawn in to eliminate syphonic action. Positive pressure ensures the valve closes and prevents foul air escaping from the system. Each valve is supplied boxed with a polystyrene insulation cover that should remain in position after installation, as this will protect the valve against freezing, particularly when installed in a roof space.

To ventilate the underground drainage system and to minimise the effects of back pressure should a blockage occur, the branch or main drain serving a stack or stacks fitted with Durgo valves may require conventional venting at a point upstream of the stack connection.

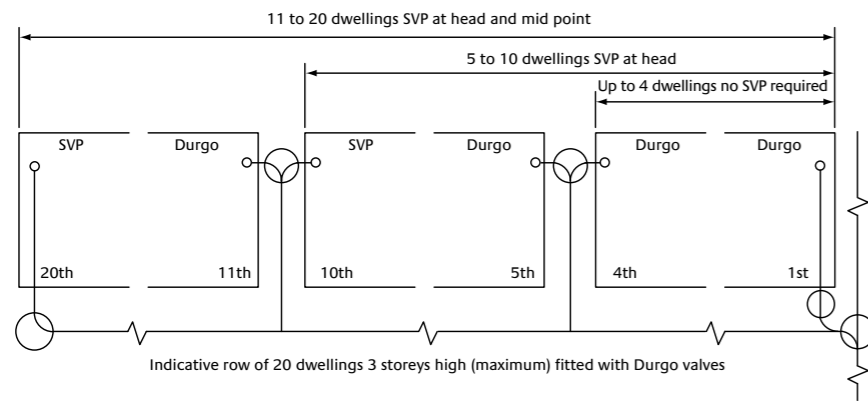
For up to and including four dwellings, 1, 2, or 3 storeys in height, additional drain venting is not required. Where a drain serves more than four such dwellings equipped with the valve, the drain should be vented according to the following rules:

5 to 10 such dwelling – conventional ventilation to be provided at the head of the system.

11 to 20 such dwellings – conventional ventilation to be provided at the mid-point and at the head of the system.

For multi-storey domestic dwellings (other than those referred to previously) and non-domestic buildings, conventional drain venting should be provided if more than one such building, each equipped with the valves, is connected to a common drain which itself is not vented by means of a ventilating stack or a discharge stack not fitted with a valve.

Stacks should not be fitted with valves when the connecting drain is subject to periodic surcharging or is fitted with an intercepting trap. An open vent must be provided and this also applies to stacks that discharge to a cesspool or septic tank.



## Fire protection

The Building Regulations 1991 (as amended) require that a building shall be sub-divided into compartments where necessary to inhibit the spread of fire. Plastics pipework is permitted to penetrate separating walls, compartment walls and floors provided the appropriate measures are taken to prevent the spread of fire in accordance with Part B of the Approved Document (2010).

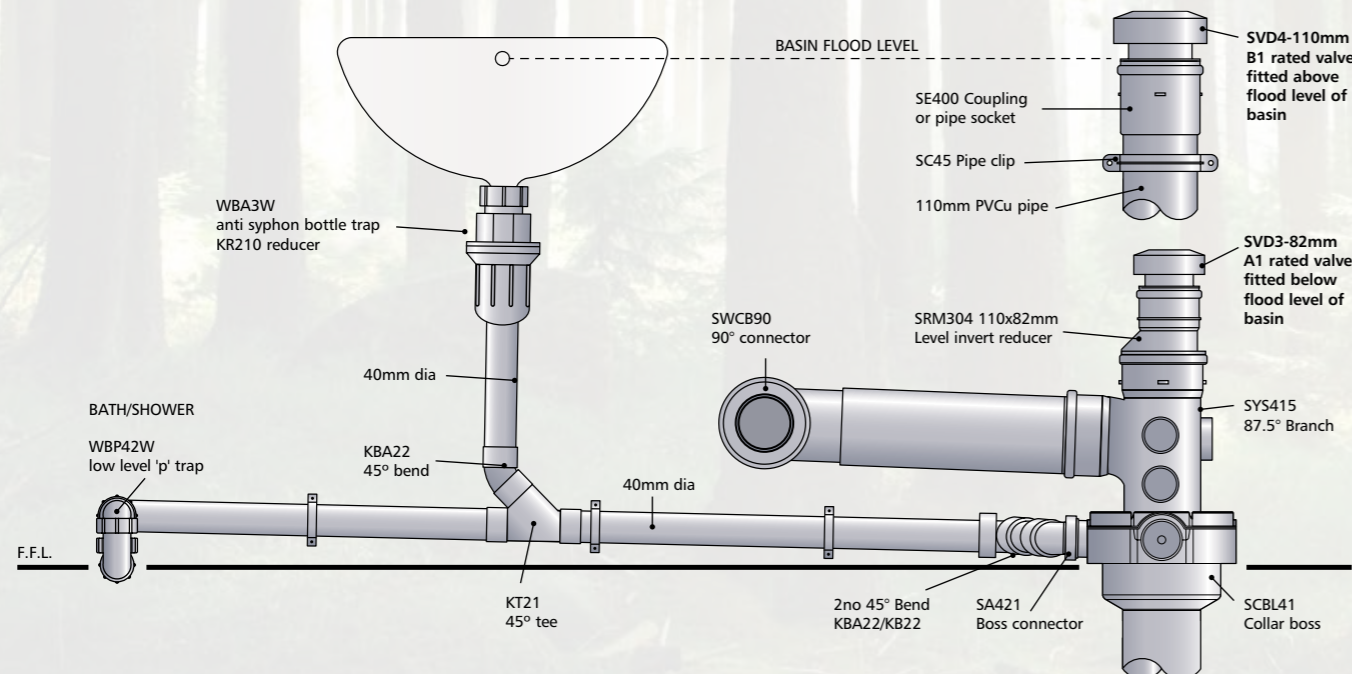
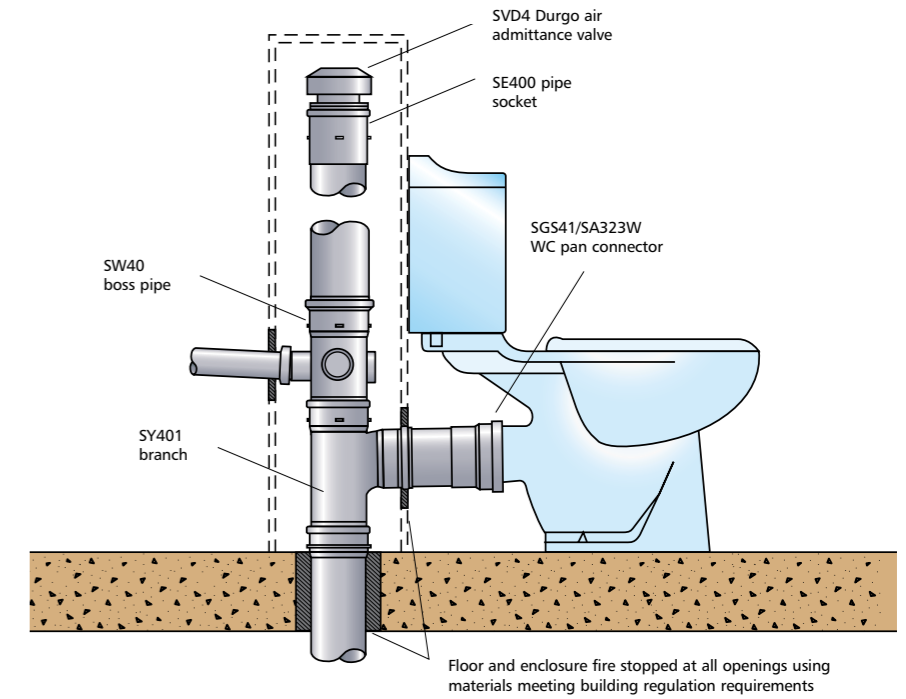
To comply with this, pipes must be enclosed within a fire resistant enclosure which extends from floor to ceiling within each storey. The enclosure must have a class 'O' internal surface and have each side formed by a separating wall, external wall or by casing. Any casing must have a minimum 1/2 hour fire resistance and penetrations of the duct must be limited to 160mm vertical and 110mm horizontal.

Where longer periods of fire resistance are required, Marley fire collars or pipe wraps can be fitted to provide a fire rating of up to 4 hours depending on the actual construction detail. Tests carried out at the Warrington Fire Research Centre in accordance with BS 476: Part 20: 1987 verified the integrity of each construction detail shown opposite in respect of fire spread.

In addition to the above, tests carried out at FIRTO on a variety of typical sanitary pipework arrangements proved that it was possible to achieve up to 1 hour fire rating through a compartment floor without a fire collar or pipe wrap where the stack was terminated by an air admittance valve. Various other arrangements were also tested and achieved a minimum of

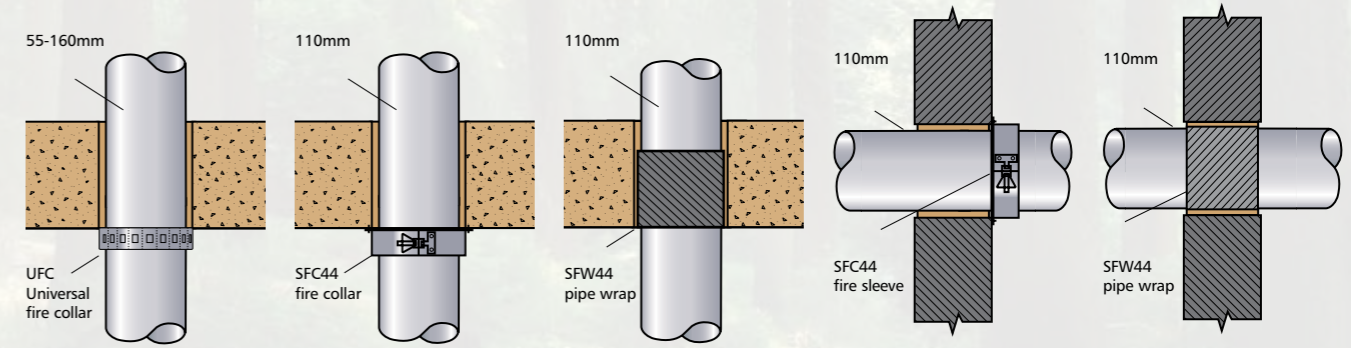
2 hours integrity. The test work and technical evaluation was independently assessed by the British Board of Agrément who issued Agrément Certificate 86/1785 together with eleven detail sheets illustrating each assembly. Copies of this original certificate and the detail sheets are available from Marley Plumbing & Drainage.

The construction illustrated below achieved a 1 1/2 hour fire resistance rating without the need for a fire resistance enclosure. The enclosure is necessary to achieve a 2 hour rating.



## Fire protection

Marley Fire Protection Products provide up to 4 hours resistance. Suitable for use with all Marley plastic drainage systems



### Universal fire collar

fixed to soffit of concrete floor

### Fire collar

fixed to soffit of concrete floor

### Pipe wrap

fixed within concrete floor

### Fire collar

fixed to exposed side of fire compartment wall

### Pipe wrap

fixed within fire compartment wall



## Joining techniques

The ring seal has been successfully employed as the principal method of joining large diameter PVCu pipes and fittings since their introduction over thirty years ago. This particular technique has proved extremely reliable as the joint can accommodate thermal movement that will occur as a result of temperature variations. An expansion gap of between 5-10mm should be allowed within each ring seal socket as each full length of pipe is installed and fixed using socket and barrel pipe clips.

Solvent weld jointing is also widely used and many components in the range are available with this facility to provide an effective alternative. By selecting these fittings a solvent weld system can be installed, however, ring seal joints must be incorporated to control thermal movement.

While the most popular method of joining larger size PVCu pipes and fittings is by ring seal, with small diameter waste pipework the principal choice is usually solvent weld. Where this technique is used expansion couplings must be introduced where pipe lengths exceed 2 metres or between fixed points. The same principle should also be adopted when the polypropylene push-fit waste system is installed.

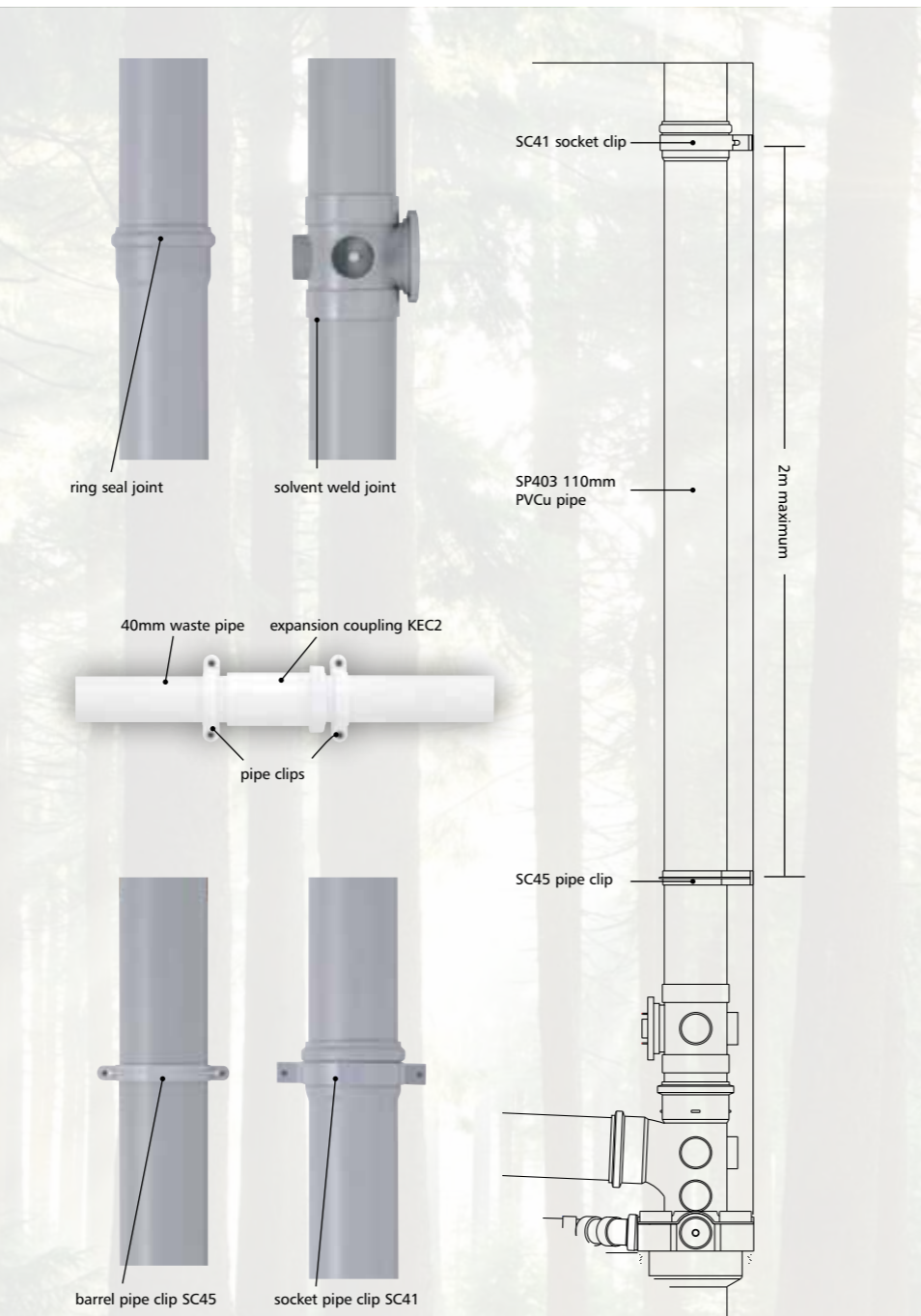
It should be noted that polypropylene cannot be solvent welded and together with the PVCu waste system must not be fitted externally unless painted to protect it from ultra-violet degradation.

## Pipe support

Experience has proved that an efficient and reliable PVCu sanitary pipework system depends considerably on the attention that is placed on the correct provision of pipe support brackets. This is particularly important in multi-storey buildings where care must be taken to ensure clips are positioned to control thermal movement at each floor level.

Plastic coated metal socket clips are designed to fit ring seal sockets and act as anchor brackets. These used in conjunction with PVCu intermediate pipe clips, control expansion and contraction and maintain the vertical alignment of the stack.

Two piece socket clips SC41/61 may be adapted to suit the appropriate pipe size by using a section of barrel clip collar SC621 to provide the necessary spacer sleeve. The table below indicates the maximum recommended support centres of different size plastic pipe systems.



Pipe material	BS Nominal pipe size	Horizontal support (m)	Vertical support (m)
PVCu	21.5	0.50	1.20
Polypropylene	32	0.50	1.20
	40	0.50	1.20
PVCc	32	0.50	1.20
ABS	40	0.50	1.20
	50	0.60	1.20
PVCu	82	1.00	2.00
	110	1.00	2.00
	160	1.20	2.00

## Marley pipe support system

The Marley pipe support range was developed to meet the specific requirements of PVCu suspended sanitary pipework and drainage systems. Manufactured in zinc electro plated mild steel for internal use, the versatile range of components can be assembled to provide a robust, lightweight system suitable for most applications. The system also provides suitable control of expansion and contraction.

The arrangements of brackets and channel supports have been extensively tested and the assembly techniques used have been successfully employed on many domestic and commercial installations.

### Single support

Recommended for waste or larger diameter pipework fixed within 500mm of the floor soffit.

### Double support

Developed for use with larger diameter pipework fixed within 1.0m of the floor soffit.

### Pipe brackets

The 110mm two piece pipe brackets are designed to fit round the ring seal socket of a pipe or fitting. Where intermediate support brackets are located, the SC621 PVC barrel clip collar is used as a spacer sleeve between the pipe and bracket.

### Angle and side bracing

Angle braces should be provided at 6m centres to prevent lineal and thermal movement. Side bracing may also be necessary on long runs where there are no side connections to eliminate lateral movement.

### Vertical pipes

The transition between vertical and horizontal pipework should be achieved using two 45° bends or a single 87½° long radius bend with a support bracket positioned as close as possible.

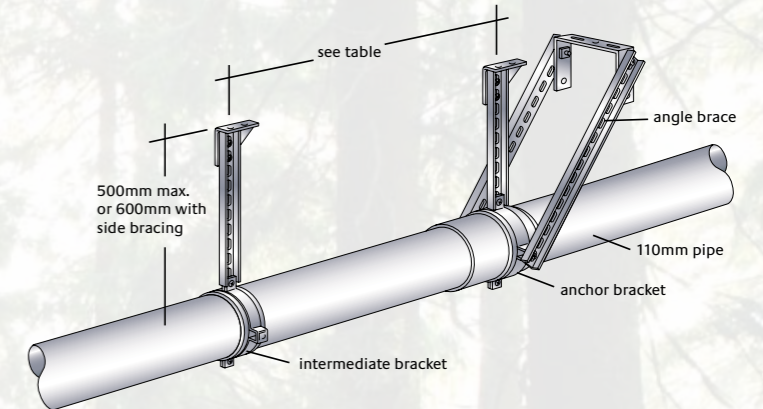
### Branch connections

All branch connections into horizontal pipework should be made at 45° to ensure the discharge is swept in the direction of flow.

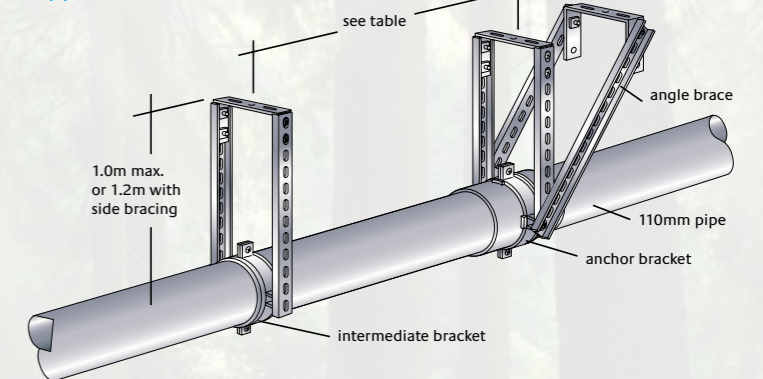
### Structural fixings

It is recommended that 6mm rawlbolt or similar proprietary fixings are used to secure base plate and angle cleats to the structure.

### Single support



### Double support



## Boss branches

The Marley range of five boss branches are designed to allow multiple waste pipe connections to be made to the discharge stack from different directions. Four different side entry combinations are possible together with a rear if required. Staggered waste pipe connections, directly opposite are not permitted as cross-flow could occur.

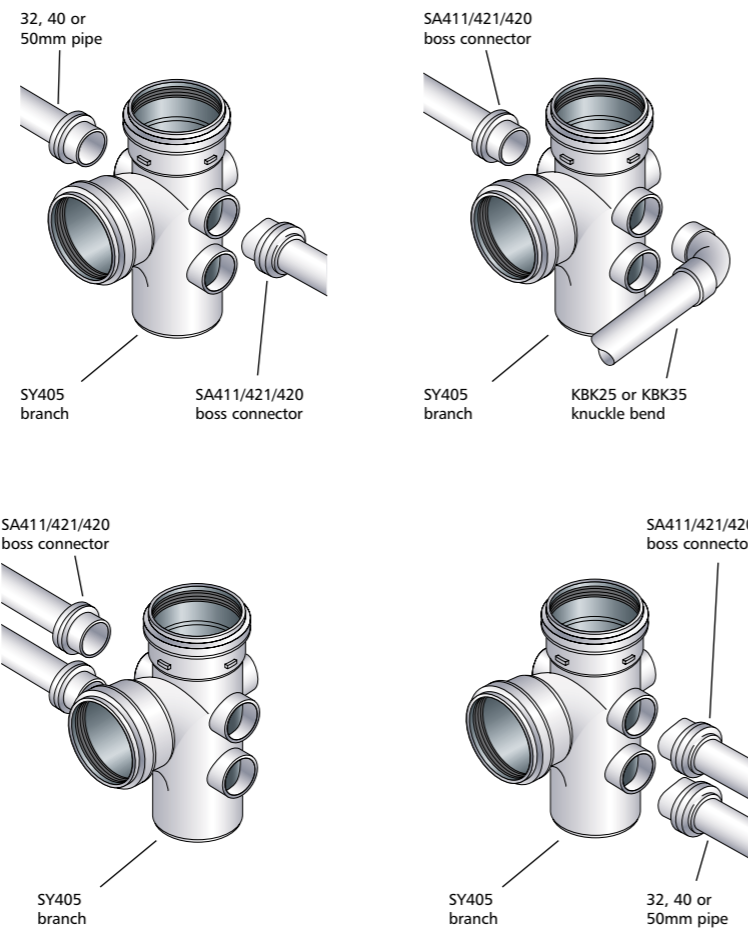
## Compatibility

Boss pipes, boss connectors and strap-on bosses fitted with multi-fit 'T' ring seals are suitable for use with PVCc or ABS waste systems to BS EN 1566 or BS EN 1455-1, polypropylene to BS EN 1451-1 and metric size copper to BS EN 16090.

Un-perforated boss upstands on boss pipes, branches and reducers may be drilled to accept 32, 40 and 50mm boss connectors SA411, SA421 and SA420 using a 51mm diameter hole saw. Knuckle bends KBK25 and KBK35 may also be used as 90° boss connectors for 40 and 50mm PVCc or ABS waste pipework.

## Horizontal connections

The SWS4135 boss pipe is recommended for use in horizontal situations where connections to 110mm diameter pipe is made at 45°. This fitting has a 50mm solvent weld socket to accept PVCc or ABS waste pipes.



## WC connections

Two different types of connectors are available to allow connection to vitreous china or stainless steel WC pans, slop hoppers and other similar sanitary equipment. Manufactured in PVC and eva (ethylene vinyl acetate) to accommodate a range of outlet sizes between 84 and 110mm sanitary pipework or underground drainage.

The 90° ST40W, ST41W and SG40W connectors are supplied complete with flexible seal and retaining cap. Where the SGS41W or STS41W pan connectors are used, the WC socket must be trimmed to suit the length of pan spigot before the SA323W is solvent welded in position.

Ground floor toilets often have their own connection to the building drain to eliminate pipework and ducting. Where this occurs both types of connector are suitable for push-fit or solvent weld jointing to the 110mm PVC drain.

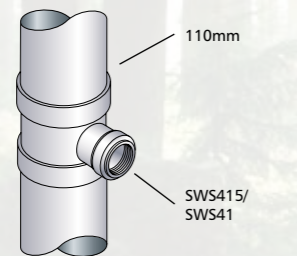


## Boss pipe connections

Four different types of fitting are available to provide alternative methods of connecting small diameter waste pipes to 82, 110 and 160mm vertical discharge stacks.

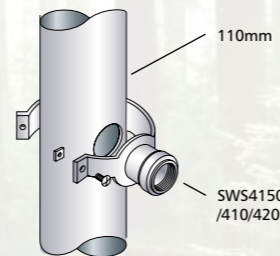
### Single boss pipes.

Available with ring seal or solvent weld sockets for push-fit or solvent weld jointing, single boss pipes allow 32, 40 and 50mm waste pipe connections to be made at 87½° direct to the vertical stack.



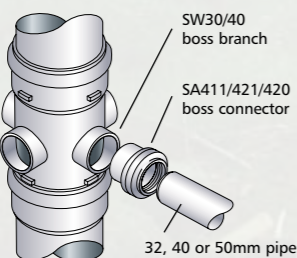
### Strap-on-bosses.

Primarily designed to permit 32, 40 and 50mm waste pipe connections to be made to existing 110mm PVCu discharge stacks, strap-on-bosses can also be used on new systems to provide flexibility of installation during different stages of construction.



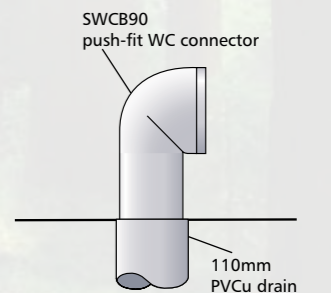
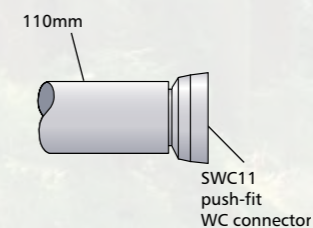
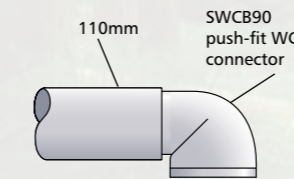
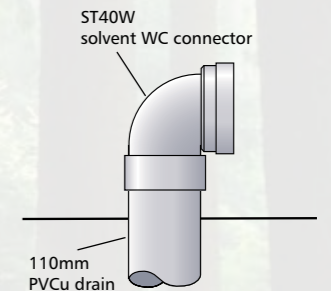
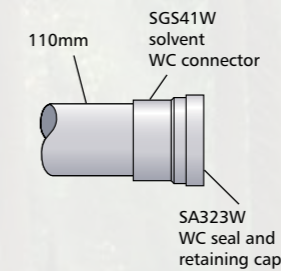
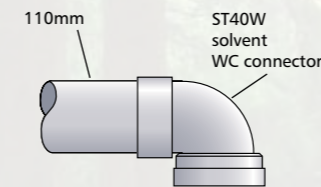
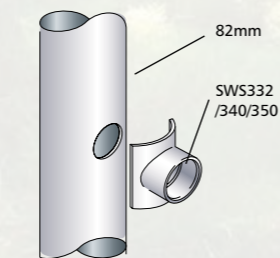
### Multiple entry boss pipes.

Supplied in ring seal or solvent weld options, all have 90° boss upstands moulded on each fitting with one inlet port open. Connection is made using the appropriate size Marley boss connector to suit 32, 40 or 50mm waste pipes.



### Patch bosses.

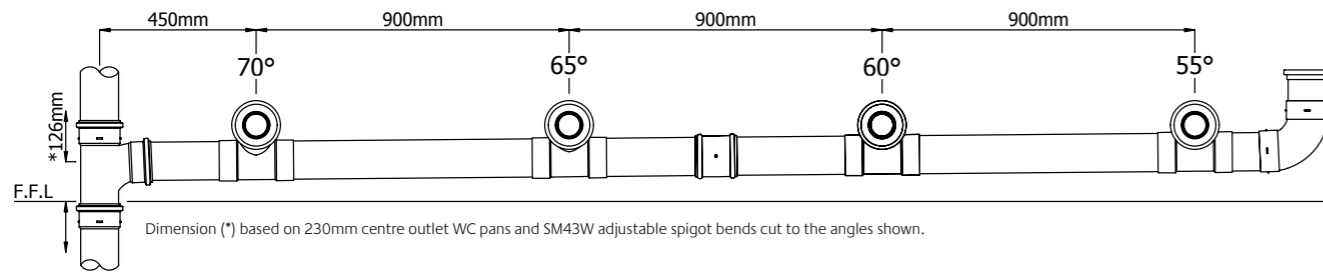
Suitable for solvent weld jointing to new and existing 82mm diameter PVCu discharge stacks to accept 32, 40 and 50mm size PVCc or ABS waste pipework.



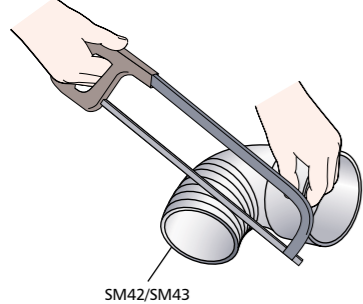
## WC manifold system

Up to six WCs can be connected to a soil stack using the WC manifold system and a single branch connection. By using a double branch connection, an additional six WCs can be connected. The table, right, details the angles of the manifolds for this installation.

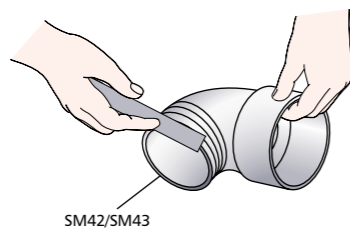
NUMBER OF WCs	ANGLE OF MANIFOLD BRANCH					
	WC 1	WC 2	WC 3	WC 4	WC 5	WC 6
6	80°	75°	70°	65°	60°	55°
5	75°	70°	65°	60°	55°	
4	70°	65°	60°	55°		
3	65°	60°	55°			
2	60°	55°				



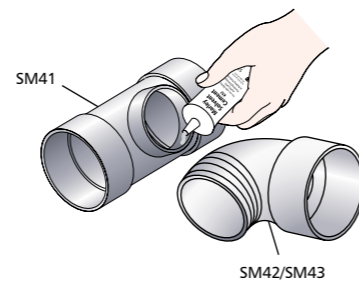
1. Select the adjustable bend angle required from the above diagram according to the WC position. Cut the bend with a hacksaw, removing the unwanted portion.



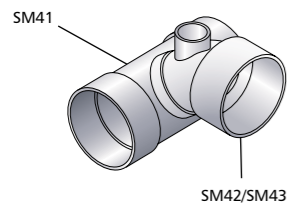
2. File away any rough edges from the face of the fitting and wipe clean the bend and branch, with a dry cloth. Before jointing, the bend and branch should be checked for position and alignment, both parts being marked to ensure accurate assembly.



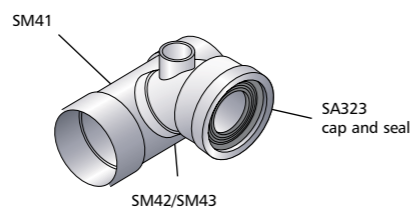
3. Apply a uniform coat of Marley solvent cement, to the short branch radial socket and to the external surface of the bend body.



4. Assemble the branch immediately, insuring that the marked lines on the fitting coincide. Do not twist the two parts of the branch during this operation, but maintain steady pressure until the spigot of the bend comes to rest against the internal surface of the branch socket. Quickly wipe off any surplus solvent cement from the inside and outside of the completed joint and hold in position for approximately 15 seconds.



5. Trim the WC socket to suit the toilet pan spigot length and remove any swarf with a file. Place the seal in the socket, apply a uniform coat of solvent cement about 15mm wide to the outside of the socket and inside the retaining cap. Push onto the socket and wipe off any surplus solvent cement.



To accommodate varying dimensions between the WC spigot and the centre line of the horizontal pipe run, the adjustable spigot bend SM43 or extension pipe SM45 can be used with WC connector SM44.



## Site Work

### Inspection and testing

Inspection and testing should be carried out in accordance with BS 12056: 2000 and Building Regulations noting especially the details given in respect of air testing and the fact that smoke testing of plastics pipework should be avoided as the materials can be adversely affected.

### Air test

The installation should be capable of withstanding an air test of positive pressure of at least 38mm water gauge for at least 3 minutes. During this time every trap should maintain a water seal of at least 25mm.

### Handling

PVCu pipes are strong, though lightweight and therefore very easily handled. However, reasonable care should be exercised while handling, particularly in extremely cold conditions. Pipes should preferably be loaded and unloaded by hand but if mechanical handling is used, protected slings are recommended.

### Maintenance

Provided that the system is designed and installed correctly, no maintenance will be required.

If blockage does occur, use only flexible or roller type rods. Pointed or bearing type metal fittings are not recommended. Tests have been carried out on PVCu pipes and fittings using equipment from specialist drain cleaning contractors and their standard equipment is suitable.

### Safety

The relevant regulations are outlined in the Health and Safety At Work Act 1974 and The Construction (Design and Management) Regulations 1994 and should be followed. Hazard sheets, dealing with the correct storage, use, and any hazards of working with solvent cement, silicone lubricant and fire protection products are available from Marley Plumbing & Drainage.

### Storage

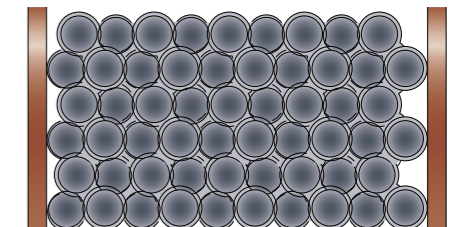
Pipes should be stacked on a reasonably flat, level surface on timber battens not less than 75mm wide spaced at a maximum of 1m centres. Side support should also be provided at intervals of not more than 1.5m.

Different size pipes should be stacked separately. However, where this is not possible, larger diameter pipes should be placed at the bottom.

Spigot and socket pipes should be stacked separately. However, where this is not possible, larger diameter pipes should be stacked with

sockets at alternate ends protruding to ensure pipes are evenly supported along their length.

Pipes should not be stacked more than 7 high and when stored in the open for long periods, or exposed to strong sunlight, they should be covered with an opaque sheet. Fittings supplied in cardboard boxes or polythene bags should be stored under cover and kept packed until required. Solvent cement should be stored in a cool place out of direct sunlight and away from any heat source.



## British & European Standards

### BS EN 1329-1: 2000

Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure – PVCu.

### BS 4514: 2001

Specification for PVCu soil and ventilating pipes, fittings and accessories.

### BS EN 1566-1: 2000

Specification for thermoplastics waste pipe and fittings.

### BS 5255: 1989

Specification for thermoplastics waste pipe and fittings.

### BS EN 1455-1: 2000

Plastics piping systems for soil and waste (low and high temperature) within the building structure – ABS.

### BS EN 1451-1: 2000

Specification for polypropylene waste pipe and fittings.

### BS EN 274: 2002

Waste fittings for sanitary appliances.

### BS EN 806-4: 2010

Specification for installations inside buildings conveying water for human consumption.

### BS 5627: 1984

Specification for plastics connectors for use with horizontal outlet vitreous china WC pans.

### BS EN 14680: 2006

Specification for adhesives for non-pressure thermoplastics pipe systems.

### BS EN 681-1: 1996

Elastomeric seals. Material requirements for pipe joint seals used in water and drainage applications. Part 1 vulcanised rubber.

### BS EN ISO 9001: 2008

Quality systems. Model for Quality Assurance in Design, Development, Production, Installation and Servicing.

### BS EN ISO 14001: 2004

Environmental management systems. Requirements with guidance for use.



### Marley HDPE

Marley Akatherm HDPE is a drainage system which offers an alternative solution to cast iron. It is particularly suited for commercial applications or where a product with high impact or abrasion resistance is required, such as hospitals, hotels, schools, as well as residential buildings. HDPE will also cope with temperature variations of -40°C to 100°C making it ideal for external as well as internal installations.



### Marley dBlue

An Acoustic soil and waste range with a triple layered pipe providing quick, hygienic removal of sanitary waste water. The noise generated by the flow of water is dramatically reduced – making it perfect for multi-occupancy apartment blocks and high specification developments.



### Marley waste systems

A wide range of PVC-C, ABS and polypropylene waste ranges from 32mm to 50mm and in a variety of colours. The range includes waste traps in a hygienic white finish and higher specification chrome finish. Available with solvent weld, compression and push fit jointing.



### Marley sanitary

High quality, durable, water and energy efficient solutions for the modern wash room, the range includes sanitary frames, concealed cisterns, flush actuation plates, linear and point drainage. Ideal for all situations, from commercial applications, including special products for schools, to high specification domestic settings.



### Marley rainwater

Seven gutter profiles and five downpipe options provide a rainwater solution for any application. Advanced Life<sup>4</sup> technology on four of the key profiles, coupled with the benefits of the Easyclip and notching capability combine to make the Marley rainwater range the most comprehensive available.



### Marley underground systems

The Marley Plumbing & Drainage range of underground systems include the solid wall range, predominately for round the house drainage and Quantum structured wall range for sewer and highway drainage applications.

## Accreditations



Certificate No. 06/4325



BS EN 1329-1 : 2000  
BS 4514 : 2001  
BS EN 1566-1: 2000  
BS 5255: 1989  
BS EN 1455-1: 2000  
BS EN 1451-1: 2000



BS EN ISO 9001: 2008  
BS EN ISO 14001: 2004



### Marley sustainable drainage

The Waterloc250 cell is ideal for use in either an underground infiltration or attenuation systems. 96% of the cell volume is available to store water, minimising the extent of excavation required for the installation. The range includes Flowloc, a vortex control device, which controls the rate at which water is discharged to a surface water drain or water course.



### Marley Alutec

Alutec offer modern and traditional aluminium rainwater profiles, providing solutions for any type of building. Aluminium has high visual appeal and durability, lasting for 50 years or more. The product portfolio includes Evolve; easy to install, low cost gutter systems in four profiles. The rainwater ranges are complemented by aluminium soffit and fascia systems and roof & floor outlets.



### Equator

Equator is ideal for hot & cold water or central heating installations. A tamperproof fitting with a unique grip release mechanism ensuring that the system can only be disassembled through the use of a special de-mounting tool. Equator has been designed to meet the requirements of BS 7291: Parts 1 & 3; Class S. The complete Equator system is backed by a 30 year guarantee.



[marley.co.uk](http://marley.co.uk)

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email: [marketing@marleypd.com](mailto:marketing@marleypd.com)

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