

Macerators & Lifting Stations

A clear, non-technical guide to help you choose well



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Introduction

For those faced with buying a macerator for the first time, the whole process can seem a bit daunting. [Macerators](#) and [lifting stations](#) are great for giving people the opportunity to put bathrooms or kitchens in areas that were previously out of reach. They are, however, quite technical products and unless you happen to be an engineer even the terms used to describe their features can seem to be in a foreign language!

60 years ago, the macerator was invented by Saniflo and there was only one pump. Today the range and design of macerator has evolved and there is a much larger range of product to choose from depending on the job that you require one for.

A number of world-class manufacturers have launched innovative new [macerators](#) into the marketplace. Although [Saniflo](#) still has the highest market share, a growing number of savvy consumers, who take the time to do their own research, are finding that better technical solutions can be purchased. Manufactured by Grundfos, Stuart Turner and [Flo-Force](#), these are usually

available at much lower prices.

This guide is designed to explain in clear, non-technical, language the terminology used in connection with [macerators](#) and to explain all the features and benefits available.

Invest a little time in reading through this guide and you will be well equipped to ensure that you, or your plumber, buy the most suitable, best value for money macerator for your project.



Macerator or lifting station?

The terms macerator and lifting station are often confused.

A lifting station is a term that can be used to describe a small domestic pump designed only to pump the grey waters from a kitchen area. Or the term lifting station can also be used when describing a large commercial pump that can pump away great volumes of black water (faecal matter) as well as grey water (sink, dishwasher and washing machine).

Lifting stations can be used for showers, basins, washing machines and dishwashers. If the waste is only liquid and able to pass through a pipe without any additional treatment, then a lifting station is perfect for the job. They are however not suitable for toilets because toilets often output solid waste as well as liquid.

A macerator is a combination of a pump designed to lift waste water and a mechanism for chopping up faecal matter to enable it to be pumped to the external waste pipe.

Macerators are easily identified as they have a large round pan connector for the toilet, although they may also have other connections for additional appliances such as basins.

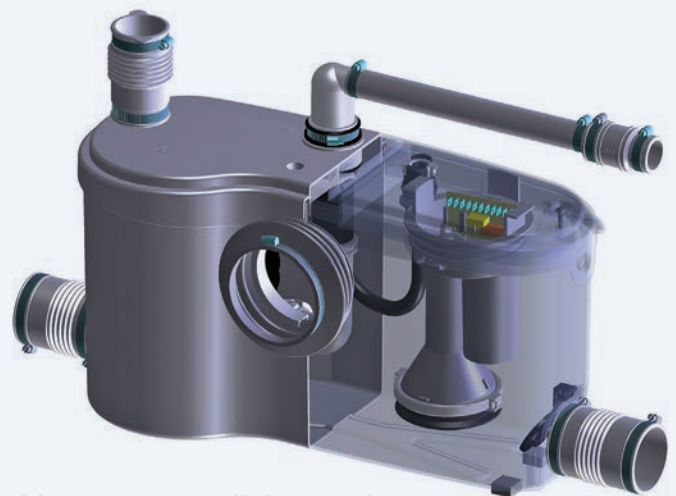
If you are installing a single toilet, a cloakroom or a complete bathroom suite which includes a toilet, then you need a macerator.

If you are installing a single shower or a basement kitchen/utility room, then you need a lifting station.

If you are intending to have both a toilet and kitchen appliances in the same project, then be aware it is against the Building Regulations to discharge a washing machine or dishwasher into a macerator. You may need both a lifting station and a macerator.



Lifting stations are for waste water only



Macerators are lifting stations with a solid waste liquifier

A modern bathroom scene with a white toilet, a white sink on a light wood vanity, a large mirror, and a potted orchid. The scene is overlaid with a semi-transparent blue filter. The floor is white tile with a grey rug, and a window with blinds is visible on the right.

The important stuff!

The important stuff:

The motor

Power: how much and how far?

As a general rule, in a macerator, the more powerful the motor the better!

All else being equal, a more powerful motor has greater capability to chop through waste (and accidentally introduced foreign objects like sanitary towels that will easily clog a less powerful macerator).

In addition, the higher the motor power the further the maximum pumping distance of the unit. This can be important if your application requires a lengthy- or winding- journey from the macerator to the external soil stack.

The power of a macerator motor is measured in Watts. Most macerators will have a motor wattage around 400 to 600w but how the macerator is designed and uses that motor power is also crucial.

Duty Rating: how long and how often?

The rating of the motor can be as important as the power, depending on the application.

All motors are rated using the 8 IEC Duty Cycles, but macerator motors are always in one of the first three categories:

S1	Continuous duty
S2	Short-time duty
S3	Intermittent periodic duty

S1 Continuous duty is the gold standard and means that the macerator can run continuously, shifting waste water through the longest shower or washing machine cycle. The [Stuart Turner Wasteflo macerators](#) are all equipped with S1 rated motors.

S2 and S3 are not designed for long continuous use. This is fine for flushing a toilet, but can be problematic when longer periods of waste water removal are required.

In addition, if the unit develops a fault that causes the motor to run continuously, S2 and S3 rated motors can be seriously damaged. This can lead to either an expensive repair or replacement of the whole macerator unit, whereas S1 Motors will be undamaged. Some S2 and S3 rated motors, depending on design would have some form of safety feature to protect the motor.



The important stuff:

Cutter systems

There are many different designs of cutter blade used on macerators depending on the manufacturer of the product.

1. Traditional 2 blade, face-on cutter

The traditional two blade, face-on cutter ([Saniflo](#) and [Flo-Force](#)) is the original design used on the first [macerators](#), but is also the **most prone to blockage**. The orientation means that any foreign object flushed down the toilet will fall directly onto the cutting blades, resulting in a high chance of jamming the motor.



2. Industrial 4 blade inverted cutter

The Industrial 4 Blade Inverted Cutter ([Stuart Turner Wasteflo](#)) is a more recent innovation, designed specifically to overcome the jamming problem. It combines four inverted, hardened steel, cutting blades with a powerful vortex pump. The inverted cutting blade design and helical pump impeller dramatically reduce the chances of blockage.



3. Industrial grade inverted grinder

The Industrial Grade Inverted Grinder ([SoloLift2](#)) is also an innovation to overcome the blockage problems of the 2 Blade design. Its orientation ensures foreign objects do not fall directly on it. As a grinder, not a blade system, there is even less for foreign objects to get tangled in and no chance of blades losing their sharpness over time and becoming less effective.



The important stuff:

Maximum pumping distance

A manufacturer's technical literature will usually provide both a maximum vertical pumping distance and a maximum horizontal pumping distance. Both are unlikely in a real-world installation! All physical pipe runs are likely to involve both horizontal and vertical distance from the macerator to the external waste pipe.

The maximum pumping distance is also reduced if you are intending to use a pipe narrower than 32mm. Most [macerators](#) allow 28mm or 22mm pipework on the outlets, but this will significantly reduce the maximum pumping distance as shown below for the [Stuart Turner Wasteflo Range](#).

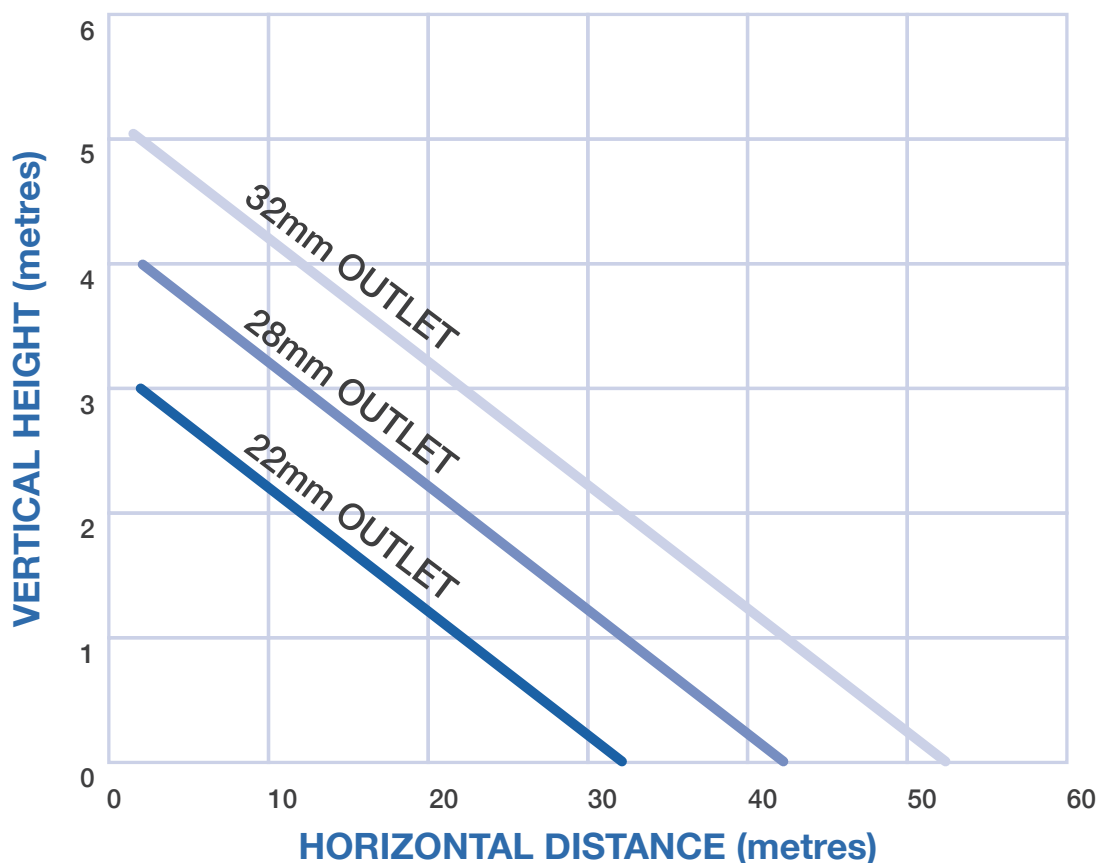
It is crucial that the pipework is run correctly as per the installation manual as an incorrect installation of any pipework would affect the productiveness of the pump and may cause damage over time.

Bends in pipework can also reduce the maximum pumping distance of a macerator. Tight 90 degree bends should be avoided- the more gradual the bend, the less the impact on maximum pumping distance.

If you have a short run to the waste pipe then most [macerators](#) will be able to handle it. But if you have:

- A long pipe run or
- you need to use 28mm or 22mm pipe or
- your pipe route has several bends

...then it is best to make sure that the macerator you choose has a maximum vertical pumping distance between 0.5 metre and 1 metre more than the absolute height difference between the macerator and the external waste pipe.



The important stuff:

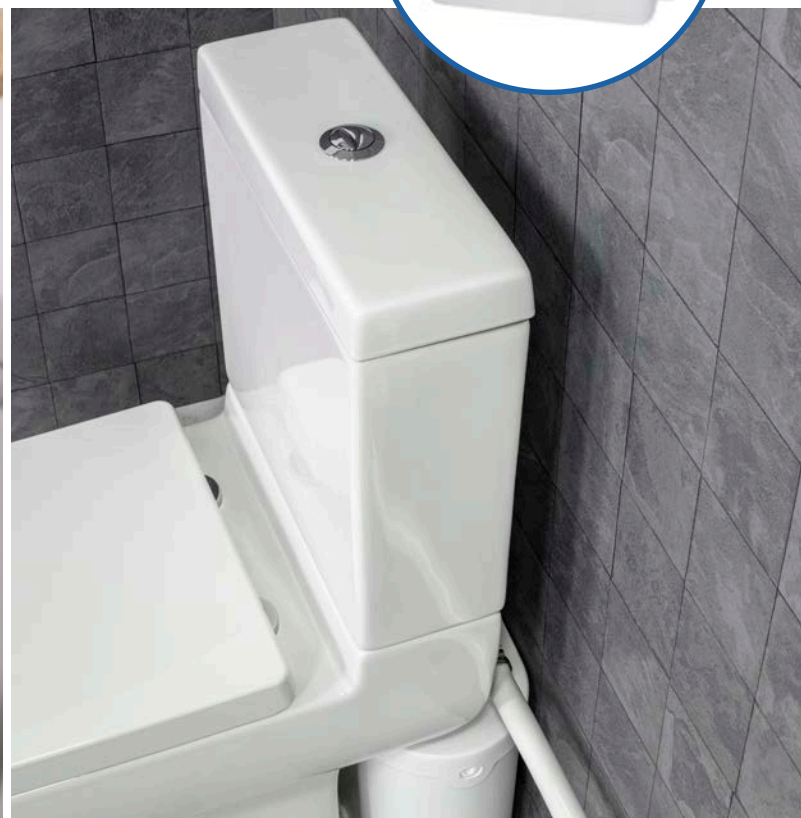
Depth required behind WC pan

There is a wide range of design and choice of ceramic when purchasing a toilet. If you are going to use a macerator in conjunction with your WC then you must be aware that the macerator box may push the WC away from the wall.

Traditional high depth required designs (Saniflo & Flo-Force)

These often create considerable gaps between the cistern and the wall. The macerator case is of uniform depth, requiring the whole unit to be as deep as the width of the motor.

Traditional macerator designs create large gaps between the cistern and the wall.



The important stuff:

Depth required behind WC pan

Medium depth required designs (Sololift2)

These create smaller gaps between the cistern and the wall, and with some toilet designs they may eliminate the gap altogether. They have the motor on one side and are slightly narrower in the central area, which reduces the depth required behind the WC Pan.



Groundfos Sololift2 WC3



Groundfos Sololift2 WC1

Low depth required designs (Stuart Turner Wasteflo)

In most cases, this design eliminates the gap between the wall and the cistern completely. The pan connector has been moved to the side of the unit. This allows the minimum possible depth requirement behind the WC Pan.

Stuart Turner Wasteflo macerators are designed to reduce or eliminate the gap between the cistern and the wall.



Stuart Turner Wasteflo WC2



Stuart Turner Wasteflo WC1



The important stuff:

Maintenance

A frequent cause of macerator malfunction is objects jamming the motor, which makes easy access for maintenance a key requirement. Some models are easier to service than others, with accessibility for different brands as follows:

A) No access panel (Flo-Force, Some Saniflo Models)

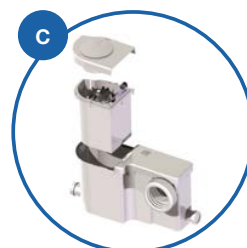
The unit must be fully disconnected from the toilet and the full cover removed to maintain the unit or remove a blockage.

B) Centrally located access panel (Saniflo Up Range)

A clear improvement over no access panel. Once the electric supply has been disconnected from the macerator and two screws have been removed, the inspection lid can be lifted from the top of the box allowing the removal of a blockage. However, because the access cover is located centrally, it is necessary to stand the WC up to 180mm away from the wall to provide clear access to the pump.

C) Offset access panel (Stuart Turner Wasteflo, SoloLift2 and SaniAccess)

The offset entry panel means the entire motor assembly is easy to access and can be removed from the unit for maintenance without disturbing the toilet.



The important stuff: Cleaning

Depending in what region of the country you are living in, then you would either be in a hard or soft water area.

The harder the water in your area then the greater the chance for the build up of limescale would be seen.

Cleaning - Horizontal 2 Blade Cutter Systems (Saniflo, Flo-Force)

Over time horizontal 2 Blade Cutter systems like those found in the Saniflo and Flo-Force ranges can start to emit foul smells.

This is due to the build-up of limescale and human waste in the 2-3 inches of water that's always left in the casing.

Macerators using this older technology need to be

cleaned and de-scaled with specialist chemicals, between 2 and 4 times a year, depending on the hardness of the water supply.

This can be an unexpected additional cost as the chemicals involved are significantly more expensive than domestic toilet cleaner!

Cleaning - Inverted Cutter & Grinder Systems (Stuart Turner Wasteflo, Sololift2)

Whereas older style horizontal cutter systems can leave faecal waste in the tank, the more modern inverted grinder (Sololift2) and inverted vortex cutter (Stuart Turner Wasteflo) are able to remove virtually 100% of the waste from the tank, eliminating any risk of bad smells!

They are also much better for the environment as they avoid the need to flush heavy chemical cleaners into the sewerage system.



The important stuff:

Waste water

Waste water temperature

[Macerators](#) can struggle to handle hot waste water. Different brands and models have different safe operating temperatures for waste water, which should not be exceeded.

The ability to handle higher water temperatures is not important if the macerator is simply attached to a toilet, or a toilet and a basin or a shower as the waste water temperature is unlikely to exceed 35°C for any period longer than a few seconds.

However, if you like long hot showers then your waste water could be hitting temperatures up to 45°C for extended periods.

[Stuart Turner Wasteflo](#), [Flo-Force](#) and [Grundfos SoloLift2](#) models all have working waste water temperatures of 50°C so are a more suitable choice.

If you are using a lifting station with a washing machine or dishwasher, then the waste water temperature can regularly hit 70°C and go as high as 90°C for short periods. The actual temperatures

will of course vary depending on your appliances and the wash cycle settings you use.

It is important to double-check that your proposed unit is designed to handle these much higher temperatures and not just assume it will be suitable. The well-known [Saniflo Sanivite+](#) lifting station only has a working waste water temperature of 60°C, rendering it unsuitable for these applications. The [Solofift2 C3](#) is a more technically suitable alternative.

Waste brine from water softeners

If you are intending to pump brine waste water from a water softener with a lifting station then be aware that this is extremely corrosive and only [lifting stations](#) with a higher grade of stainless steel components can handle it. The only products that expressly confirm they can pump this kind of waste water are the [Grundfos Sololift2 C3](#) and the [Stuart Turner Wasteflo LS5](#).



A photograph of a modern bathroom vanity with a white rectangular sink and a wooden countertop. The vanity cabinet is open, revealing a wooden shelf inside with folded white towels, a roll of paper towels, and a bottle of cleaning spray. Below the shelf, a white toilet tank and its associated plumbing pipes are visible. The background shows a white wall with a mirror, a light fixture, and a towel rack with a blue towel. The floor is made of dark grey tiles. The entire image has a blue color overlay.

Quite important stuff

Quite important stuff: Waste inlets

It is important to ensure that the macerator or lifting station you select has enough waste inlets for the number of appliances you intend to attach. Too few and it won't do the job, too many and you may find yourself paying more than you need to.



Macerator - WC connection only



Macerator - WC connection + 1 additional waste inlet



Macerator - WC connection + 2 additional waste inlets



Macerator - WC connection + 3 additional waste inlets



Lifting station - 5 waste inlets

Quite important stuff: Inlet connection fittings

There are two main ways to fit the wastewater inlet connections:

Metal jubilee clips

Metal retaining clips are used in the main to secure the inlet and outlet adapters. The metal retaining clip has been used for a wide variety of uses within the plumbing industry for many years and being stainless steel may not be affected by the conditions or surroundings they are in. Metal jubilee clips can be difficult to clean and can be prone to corrosion, making them unhygienic. Pipes can also be accidentally dislodged, resulting in leakage of foul waste water.



Nut & cone waste fittings ([Stuart Turner Wasteflo](#))

Standard nut and cone waste fittings result in easier to clean, more secure and more attractive connections. This type of fitting is found on the [Stuart Turner Wasteflo](#) range.



Quite important stuff: Toilet inlet connections

Toilet pan connectors on [macerators](#) can either be fixed or adjustable.

Fixed pan connectors

These require the toilet's waste outlet be in accordance with British Standard BS EN 33:2011. This is great in theory, but with an increasing number of toilets coming from manufacturers based in Turkey, Egypt and the Far East a significant proportion of toilets will not have the waste at this exact height.

If you find that your toilet has a waste outlet that is not exactly the fixed height required, then you will need to resort to an ugly looking flexible pan connector (shown below) to overcome the height discrepancy.



Adjustable pan connectors ([Stuart Turner Wasteflo](#))



These allow for manufacturing tolerances and variations to the British Standard, which are common with imported toilet designs.

The adjustable WC outlet can be rotated, and its eccentric design means that it can easily accommodate any variations in the height of the WC waste outlet up to ± 16 mm. This simplifies installation and avoids the need for flexible pan connectors- most of the time.





Unimportant stuff

Unimportant stuff:

Noise

One common fear with [macerators](#) is that they will be excessively noisy.

Manufacturers of [macerators](#) include noise levels in their technical specifications.

These range from a low of 40dbA up to a high of 70dbA for some models.

Of course, unless you are an engineer, it is unlikely that you know what 40dbA or 70dbA sounds like!

The table below puts dbA noise levels into context with everyday sounds that you are familiar with:

If you are very sensitive to mechanical noise, as opposed to the noise of your shower running or toilet flushing, then, it may be worth considering paying extra for a “lower noise” macerator.

However, for most people this is not necessary. No macerator is silent - all will be heard, but none will be as loud as the flushing of the toilet.

dBa	Example	Home Appliances
0	healthy hearing threshold	
10	a pin dropping	
20	rustling leaves	
30	whisper	
40	babbling brook	computer
50	light traffic	refrigerator
60	conversational speech	air conditioner
70	shower	dishwasher
75	toilet flushing	vacuum cleaner
80	alarm clock	garbage disposal
85	passing diesel lorry	snow blower

No macerator is silent - all will be heard, but none will be as loud as the flushing of the toilet.

Unimportant stuff:

Maximum flow rate

Maximum flow rates refer to the volume of waste water that the pump can move before becoming overwhelmed.

Measured in litres per minute they range from a low of 50 Litres per minute, for the [Saniflo Sanishower Flat](#), up to 204 Litres per minute for the [SoloLift2 C3](#).

However, virtually all [macerators](#) have more than enough capacity in this area. The typical water consumption for a domestic home is:

Activity	How much water is used?
Running the tap	8 - 12 litres per minute
Washing up in the sink	6 - 8 litres
Washing hands and face	3 - 9 litres
Taking a normal shower	6 - 12 litres per minute
Taking a power shower	13 - 22 litres per minute
Flushing the toilet	6 - 12 litres
Running a modern dishwasher	15 litres
Running a modern washing machine	60 - 80 litres
Having a bath	75 - 90 litres

Even running a power shower and a basin tap will not overload most of the pumps that are available.

[Macerators](#) for toilet and bathrooms have much higher capacity from 80 l/m to 150 l/m.

[Lifting stations](#) for kitchen/utility applications usually have even greater capacity, up to 204 l/m.

The only times to consider the maximum flow rate are very high intensity kitchen or utility environments, or where two baths are being used at the same time.

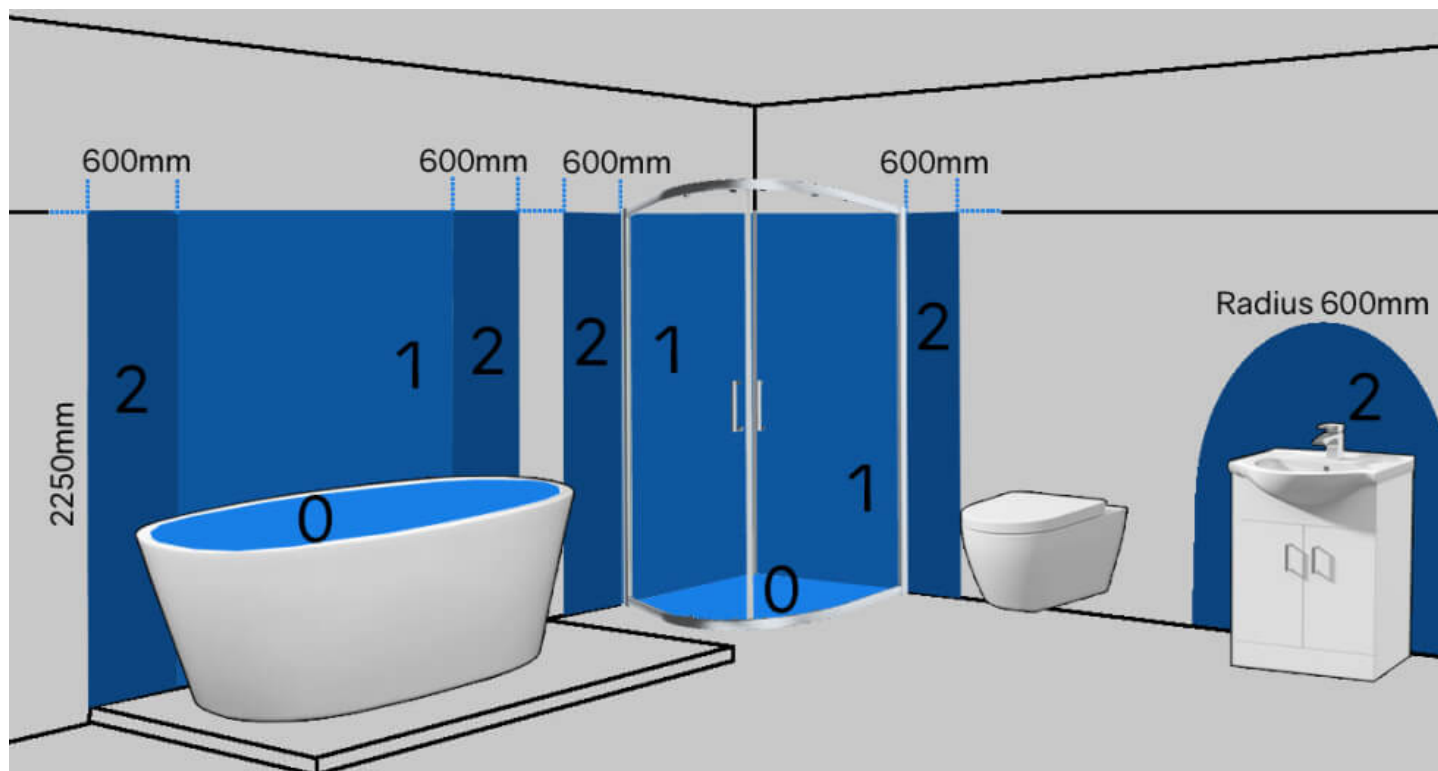
In these unusual high water volume scenarios a commercial pump or lifting station would be better suited.



Unimportant stuff: IP electrical safety rating

Electrical Safety Regulations apply to all appliances installed in the bathroom, which of course includes [macerators](#) and [lifting stations](#).

For the purpose of these regulations the bathroom is split into Zones ranging from 0 (High Risk) to 3 (Low Risk). These are illustrated below.



Unimportant stuff:

IP electrical safety rating

Each zone has a specified minimum IP rating for appliances to be suitable for installation.

IP Rating means Ingress Protection and is a standard rating recognized worldwide. The first digit represents the resistance against solid objects, while the second represents the protection offered against liquids.

Zone 0:

This is inside the bath or shower itself. Any fitting used in this zone must be low voltage, (max 12v) and be rated at least IP67 which is total immersion proof.

Zone 1:

This is the area above the bath or shower to a height of 2.25m from the floor. In this zone a minimum rating of IP45 is required but it is generally accepted that IP65 is to be used.

Zone 2:

This is an area stretching 0.6m outside the perimeter of the bath and to a height of 2.25m from the floor. In this zone an IP rating of at least IP44 is required. In addition it is good practice to consider the area around a wash basin, within a 60cm radius of any tap to be considered as zone 2.

Outside zones (Zone 3):

This is anywhere outside zones 0,1 and 2 (subject to specific limits) and where no water jet is likely to be used. There are no special IP requirements in this zone.

[Macerators](#) have safety ratings that range from IPX4 through to IP55. The letter X signifies that the product was not tested for the respective category (either solids or liquids).

IP44

A product that has a rating of IP44 means that it is protected against solid objects that are bigger than 1mm and water splashing from all directions.

IP54

A product with an IP54 rating is protected against dust ingress sufficient to prevent the product from operating normally but it's not dust tight. The product is fully protected against solid objects and splashing of water from any angle.

IP55

An IP55 rated product is protected against dust ingress that could be harmful for the normal operation of the product but is not fully dust tight. It is protected against solid objects and water jets projected by a nozzle (6.3mm) from any direction.

IPX4

An IPX4 rated product is protected from water splashes from any angle.

All macerator brands are safe for use in Zone 2 or outside zones, which is where they would usually be situated. IP ratings are unlikely to be a significant factor in the choice of the most suitable unit.

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Best buys

Best buys: Toilet only macerator



Key Feature	Flo Force Max	Sanitop Up	Flo Force Ultra	Sololift2 WC1	Stuart Turner Wasteflo WC1
Motor Power	400W	400W	600W	620W	500W
Motor Duty Rating	S2	S3	S2	S3	S1
Cutter System	2 Blade	2 Blade	2 Blade	Inverted Grinder	Inverted 4 Blade
Max Vertical Pumping Distance	5.5M	5M	6.5M	6M	5M
Ease of Maintenance	Full Removal	Centre panel	Full Removal	Side	Side Panel
Toilet Inlet Connection	Fixed	Fixed	Fixed	Fixed	Adjustable
Cistern - Wall Gap Problems	Common	Mixed	Common	Mixed	Rare
Warranty	1 Year	5 Years*	1 Year	2 Years	2 Years
Cost	Low	High	Low	High	Mid



[Stuart Turner Wasteflo WC1](#)

[The Stuart Turner Wasteflo WC1](#) offers a great combination of power, resistance to clogging by foreign objects, easy installation and all at a sensible price.

* 2 year warranty as standard on SaniFlo products increasing to 5 years on product registration.

Best buys: Shower & basin lifting station



Key Feature	Flo Force Elite	Sanishower +	Sanishower Flat	Sololift2 D2
Motor Power	250W	250W	250W	280W
Motor Duty Rating	S2	S3	S3	S3
Max Vertical Distance	4M	3M	5M	3M
Max Water Temp	45C	35C	35C	50C
Min Shower Waste Height	85mm	120mm	80mm	70mm
Warranty	1 Year	5 Years*	5 Years*	2 Years
Cost	Low	Mid	High	Mid



[Grundfos SoloLift2 D2](#)

With more power and higher waste water temperature tolerance the [Sololift2](#) is technically one of the best. Add in the lowest requirement for shower tray waste height and the mid-range price point and it's the clear "Best Buy" in the category.

* 2 year warranty as standard on SaniFlo products increasing to 5 years on product registration.

Best buys: Cloakroom (toilet & basin) macerators



Key Feature	Flo Force Max	Flo Force Ultra	Stuart Turner Wasteflo WC2	Sololift2 WC1	Sanitop Up	SaniAccess 2
Motor Power	400W	600W	500W	620W	400W	400W
Motor Duty Rating	S2	S2	S1	S3	S3	S3
Cutter System	2 Blade	2 Blade	Inverted 4 Blade	Inverted Grinder	2 Blade	2 Blade
Max Vertical Pumping Distance	5.5M	6.5M	5M	6M	5M	5M
Ease of Maintenance	Full Removal	Full Removal	Side Panel	Side Panel	Centre Panel	Side Panel
Toilet Inlet Connection	Fixed	Fixed	Adjustable	Fixed	Fixed	Fixed
Cistern - Wall Gap Problems	Common	Common	Rare	Mixed	Mixed	Common
Max Water Temp	45C	45C	50C	50C	35C	35C
Waste Inlet Connections	Jubilee	Jubilee	Nut & Cone	Jubilee	Jubilee	Jubilee
Warranty	1 Year	1 Year	2 Years	2 Years	5 Years*	5 Years*
Cost	Low	Low	Mid	Mid	High	High



[Stuart Turner Wasteflo WC2](#)

A very competitive category with 6 models across three brands. The [Stuart Turner Wasteflo WC2](#) takes the “Best Buy” because of its easier installation and maintenance features over the comparable performance and price of the [Sololift2 WC1](#).

* 2 year warranty as standard on SaniFlo products increasing to 5 years on product registration.

Best buys: Full bathroom macerators



Key Feature	Flo Force Ultra	Stuart Turner Wasteflo WC3	Sololift2 WC3	SaniPro Up	SaniAccess 3	SaniSlim	SaniPlus Up
Motor Power	600W	500W	620W	400W	400W	400W	400W
Motor Duty Rating	S2	S1	S3	S3	S3	S3	S3
Cutter System	2 Blade	Inverted 4 Blade	Inverted Grinder	2 Blade	2 Blade	2 Blade	2 Blade
Max Vertical Pumping Distance	6.5M	5M	6M	5M	5M	2.5M	5M
Ease of Maintenance	Full Removal	Side Panel	Side Panel	Centre Panel	Side Panel	Full Removal	Centre Panel
Toiler Inlet Connection	Fixed	Adjustable	Fixed	Fixed	Fixed	Fixed	Fixed
Cistern - Wall Gap Problems	Common	Rare	Mixed	Mixed	Mixed	Mixed	Mixed
Max Water Temp	45C	50C	50C	35C	35C	35C	35C
Waste Inlet Connections	Jubilee	Nut & Cone	Jubilee	Jubilee	Jubilee	Jubilee	Jubilee
Warranty	1 Year	2 Years	2 Years	5 years*	5 years*	5 years*	5 years*
Cost	Low	Mid	Mid	High	High	High	High



[Stuart Turner Wasteflo WC2](#)

A very competitive category with 6 models across three brands. The [Stuart Turner Wasteflo WC2](#) takes the “Best Buy” because of its easier installation and maintenance features over the comparable performance and price of the [Sololift2 WC1](#).

* 2 year warranty as standard on SaniFlo products increasing to 5 years on product registration.

Macerator best buys: Kitchen / utility lifting stations



Key Feature	WaterFlo LS5	SoloLift2 C-3	Sanivite +	Sanispeed +
Motor Power	460W	640W	400W	400W
Motor Duty Rating	S1	S3	S2	S2
Max Vertical Pumping Distance	7M	6M	6M	7.5M
Max Flow Rate	120 l/m	204 l/m	90 l/m	100 l/m
Top Inlets	2	1	2	2
Side Inlets	3	2	2	2
Working Water Temp	50C	70C	35C	35C
Hot Water at 90C	70C Max	30C Min	5C Min	75C Max
Water Softener Use	Yes	Yes	No	No
Warranty	1 Year	2 years	5 Years*	5 Years*
Cost	Low	Low	Mid	High



[Grundfos SoloLift2 CS3](#)

The [Sololift2 C3](#) takes the “Best Buy” just beating the [Stuart Turner Wasteflo LS5](#) into second place. The extra power, flow rate and ability to handle higher temperature waste water were the deciding factors. However, if you need more than 3 inlet connections then the [Stuart Turner Wasteflo LS5](#) is a solid choice.

* 2 year warranty as standard on SaniFlo products increasing to 5 years on product registration.

