

Macerators & Lifting Stations

A clear, non-technical guide to help you understand macerators



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Introduction

For the 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.

Doing your research and speaking to your installer and merchant can help you ensure you choose the right macerator for your project.

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.

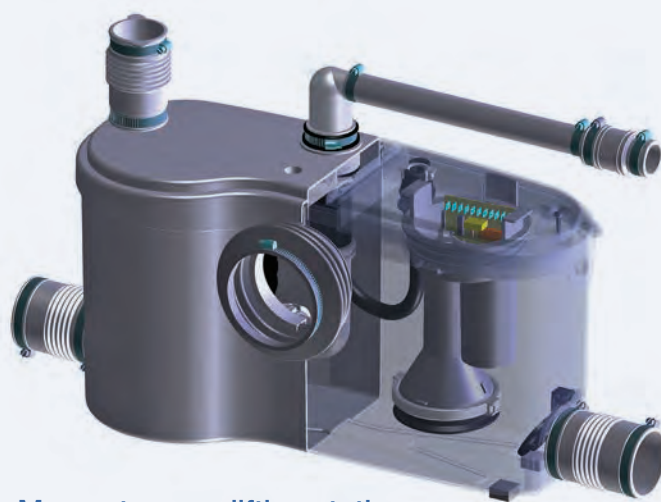
If you are installing a single toilet, a cloakroom or a complete bathroom suite which includes a toilet, then you need a macerator.

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.



Domestic [Lifting stations](#) are for waste



[Macerators are lifting stations](#) with a solid waste liquifier

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The important stuff!

The important stuff:

The motor

Power: how much and how far?

It is not always the case that bigger is best. 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.

The power of a macerator motor is measured in Watts.

For domestic macerators, motor power ranges generally from 400w up to 600w.

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

A macerator motor would normally fall in to the S2 and S3 duty cycle area. This is fine for flushing a toilet and taking away water from a shower or basin. S1 rated motors can run continuously but this isn't required in a macerator as it isn't used continuously for long periods of time.

If the unit develops a fault that causes the motor to run continuously, S2 and S3 rated motors, depending on design would have some form of safety feature to protect the motor.



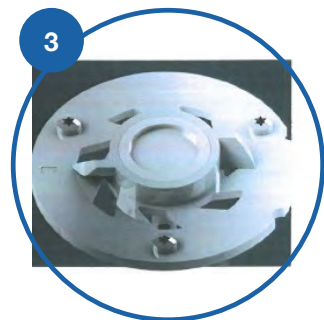
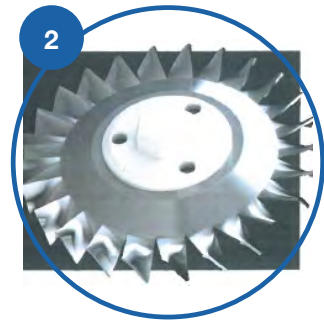
The important stuff:

Cutter systems

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

The blade design would relate to the job required of the macerator. If it is a domestic pump, then a standard design of a two bladed or similar cutter would normally be seen.

For commercial or more industrial use you would find the cutter blade system to be more robust to handle the waste matter that may be put in to the macerator.



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](#).

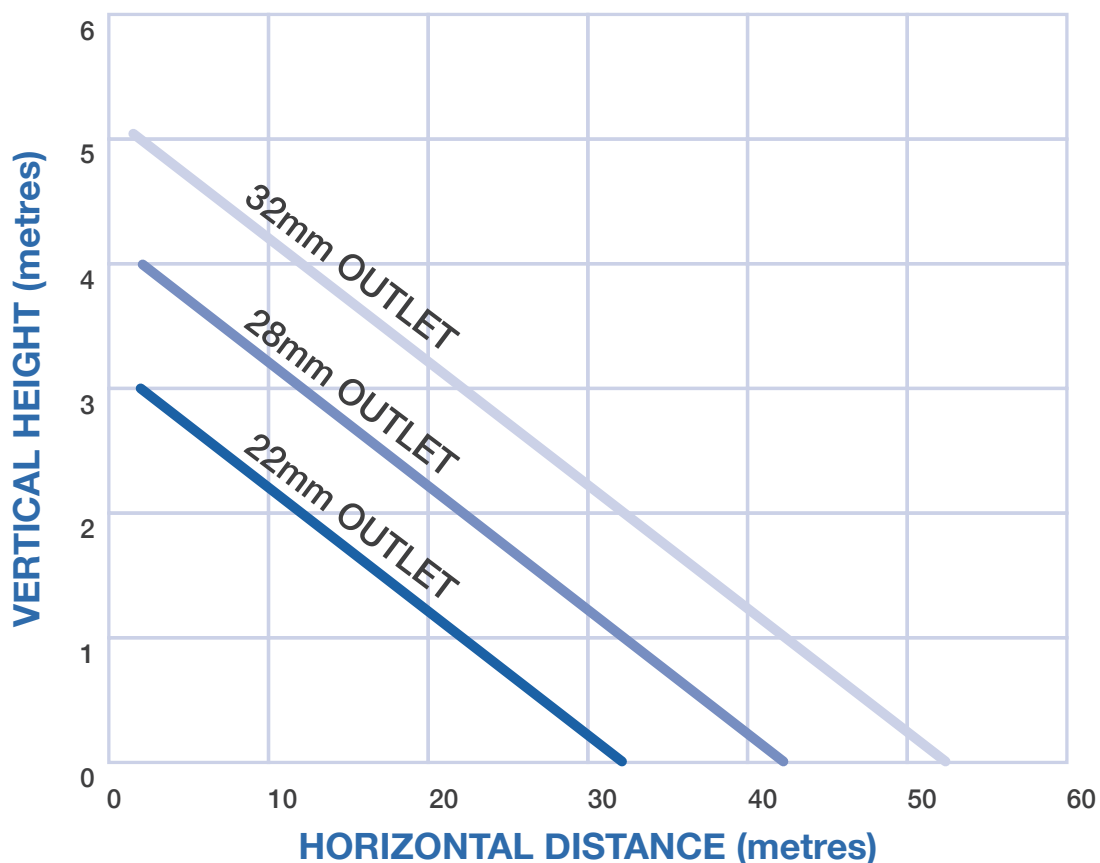
It is crucial that the pipework is run correctly as per the installation manual as an incorrect installation of any pipework would affect the productiveness of the pump and may cause damage over time.

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.

Some manufacturers of macerator pumps have designed the pump to allow the WC to fit back to the wall. Plus, there are other solutions on the market such as a WC with a built-in macerator or a macerator that can be hidden from view very close to the WC rather than sitting behind it. Also, some slimline macerators have been designed.

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

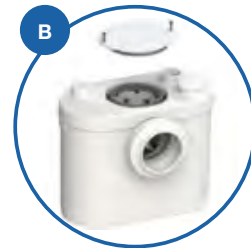
The unit must be fully disconnected from the toilet and the full cover removed to maintain the unit or remove a blockage.

B) Centrally located access panel

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.

C) Offset access panel (Stuart Turner Waste lo, 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.

To this end some manufacturers have developed a solution to both descale the pump or macerator, and at the same time will clean the internal part of the macerator box. All macerators contain small parts that can be damaged by using lots of chemicals and bleach so a specifically designed solution helps keep the macerator clean and functioning without damage.



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.

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.

With a washing machine the water has normally been cooled before it leaves the machine and enters the pump.

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.



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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

Quite important stuff:

Inlet connection fittings

Nut & cone waste fittings (Stuart Turner Wasteflo)

Standard nut and cone waste fittings are also used by some manufacturers.



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.



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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, the range of macerators and lifting stations vary. 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.

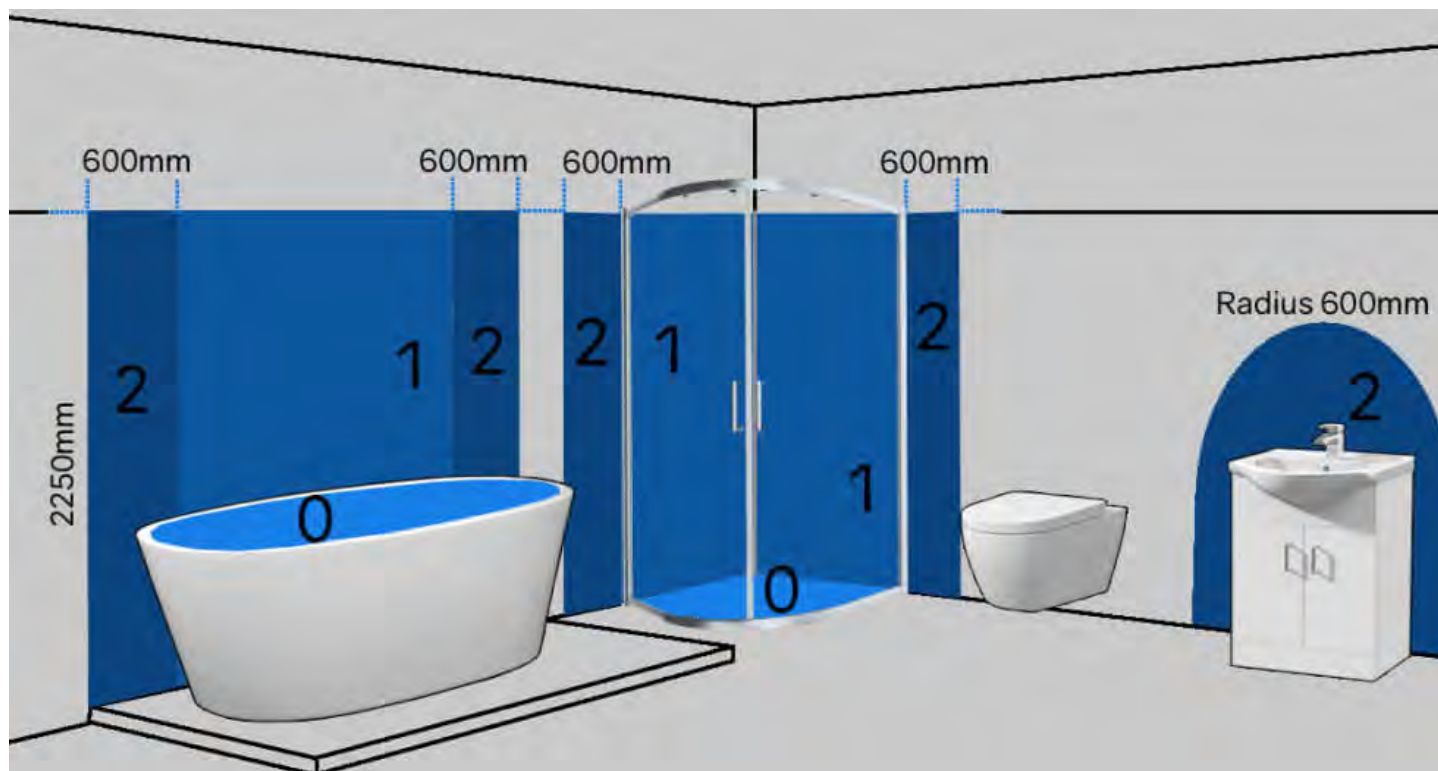


Unimportant stuff:

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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