

best practice in UK siphonic drainage,  
from design to installation.

To research, set standards and disseminate

# An Introduction to Siphonic Drainage Systems



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Siphonic drainage was first introduced in the 1960's in Scandinavia and since then has been used widely across Europe, including the UK, in the Far East, Australasia, South Africa and the USA. Many industrial, commercial and retail buildings are now fitted with siphonic drainage, which has clear advantages over gravity drainage.



## Siphonic industry today

- ③ Several major companies with wide experience in rainwater systems, working with approved installers.
- ③ A British Standard BS8490: 2007 Guide to siphonic roof drainage systems.
- ③ An industry association to promote good practice and ensure high standards are maintained.

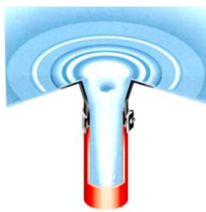


## How it all works

The presence of air in the pipe (approx 35 litres of air to 1 litre of water in 100mm diameter pipe) is the fundamental principal in all gravity drainage. The inlet of water in the roof outlet produces a vortex of air (i.e. the whirlpool effect).

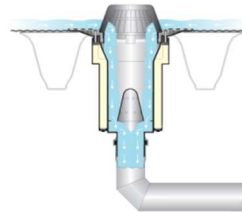
Siphonic drainage is actually very simple in principle and all systems work in exactly the same way. Baffle plates inserted in the outlets restrict air entering the top of the system which, when combined with carefully sized pipework, causes the system, horizontal and vertical, to run full. In a very similar way to a simple tube siphon (such as you would use to empty a fish tank), the action of water dropping down the downpipe will cause a negative pressure to form at the top. This negative pressure can be harnessed to suck water along a collector pipe installed horizontally connecting the outlets at high level.

### Gravity Drainage

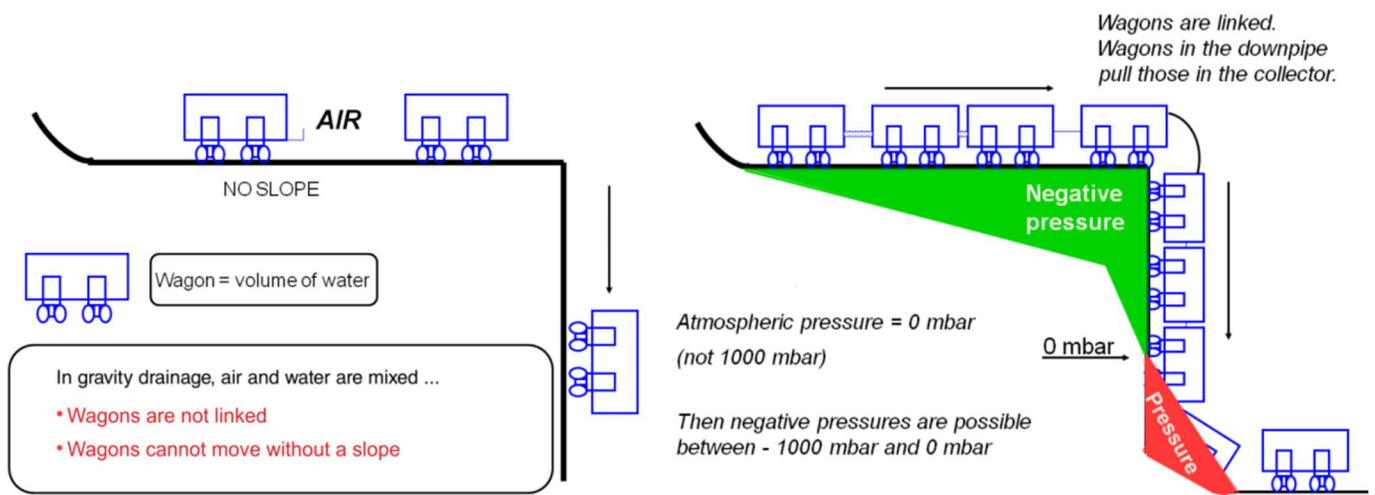


Air and water enter a gravity outlet.

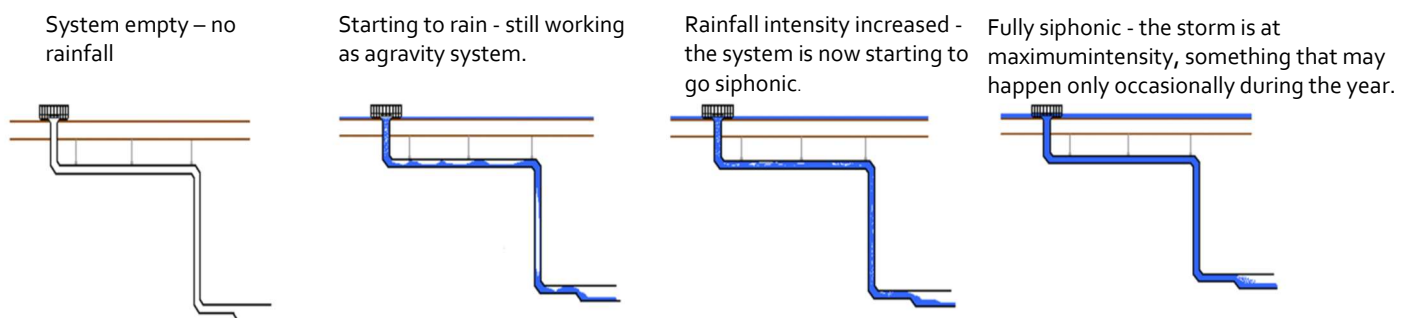
### Siphonic Drainage



At a given head of water, only water enters the outlet.



### How a Siphonic system self-primes



**Specify Companies within the SRDA**

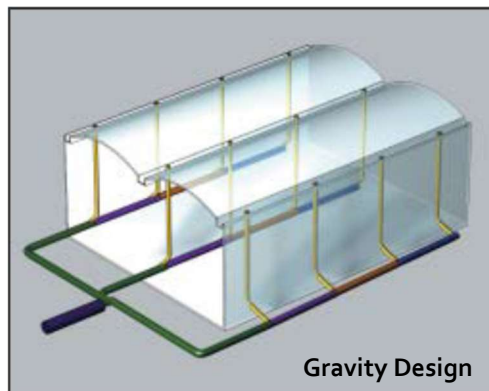


## The benefits this gives are:

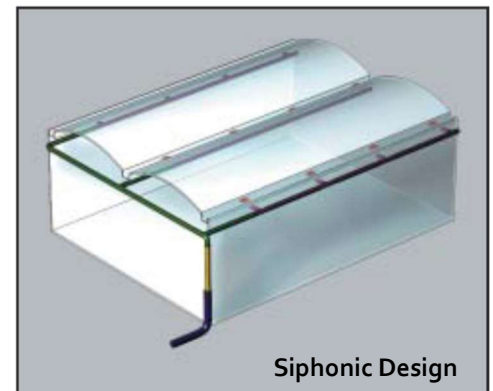
- ③ Each gutter will have only one or two downpipes, and these can be located at the end of the building, allowing free use of floor space by eliminating downpipes and therefore reducing columns.
- ③ The horizontal collector pipe can be very close to the gutter, allowing full use of internal space.
- ③ Underground drainage can be eliminated internally in building, and can be significantly reduced externally, which can provide considerable cost savings and streamline the construction programme on all sites, particularly contaminated ones.
- ③ For sites with a requirement for Sustainable Urban Drainage (SuDS), siphonic drainage will allow water to be delivered at a designated point at shallow depth, which can significantly reduce the construction costs, especially for pond-based solutions.

## Advantages of siphonic drainage

- ③ Better integration of network inside building.
- ③ Reduction in downpipe diameters.
- ③ No gradient for horizontal pipework.
- ③ Reduction in number of downpipes.
- ③ Less water on roof during heavy rain



Gravity Design



Siphonic Design

## Where should siphonic systems be specified?

Almost any building can use siphonic roof drainage, with the following provisos:

- ③ The gutters or flat roof areas must be large enough to accept a siphonic outlet and must have adequate access for maintenance. Gutters in inaccessible locations may not be so suitable.
- ③ All drainage can produce unwanted noise. In areas sensitive to sound siphonic systems like gravity pipework may require acoustic insulation.

Siphonic roof drainage is typically installed in industrial, storage or retail buildings - in fact in the larger of these building types it would be almost impossible to drain their roofs with a gravity system.

## What to specify

When specifying siphonic drainage refer to BS8490:2007. There are a number of key factors which must be considered. These are:

### Rainfall Intensity

- ③ Determined by BS EN 12056-3 : 2000
- ③ Using projected building life and a suitable factor of safety
- ③ Contents of building should be considered

### Filling Time and Gutter Calculations

It is essential that:

- ③ The system will fill within one minute
- ③ The system will not over-top

### Choice of Suitable Pipe Materials

- ③ HDPE to EN 1519 using electrofusion coupling or by butt weld
- ③ Cast Iron pipe systems to BS EN 877
- ③ Galvanised Steel to EN1124
- ③ Stainless Steel

### UK Codes and Industry Guidance

- ③ BS8490:2007
- ③ SRDA 'The Siphonic Guide, 2006'

The Siphonic Roof Drainage Association (SRDA) was set up in 2004 to promote a wider understanding of the principles of siphonic drainage, to promote good practice among siphonic companies, and to provide a recognised platform for specifiers.



Members have to comply with the following requirements to gain membership:

- ③ A suitable siphonic outlet.
- ③ A pipe and bracket system capable of accepting the dynamic loading from siphonic flow
- ③ Design software capable of accurately assessing the very complex flow regime in the system (third party accredited i.e. British Board of Agrément).

They must not use misleading advertising, make false claims about benefits of a particular product, or denigrates another.

All the requirements must have been assessed as suitable by a third party organisation.

All members are subjected to an annual random check by the Association to confirm that their design and installation procedures are being properly implemented. This helps to ensure that standards are maintained, and that there is a thorough understanding of the important factors throughout the company structure.

## Full Members



**Siphonic Roof Drainage Association**  
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