JAS SIPHONIC

www.jas-siphonic.com

TOTAL RAINWATER MANAGEMENT

Our Professional Team

Rainwater Management Specialist Team

JAS rainwater management engineering team composes of specialists of various field such as designer, cost estimator, installation trainer, and also quality controller. With their wide diversity of knowledge and experience, JAS can provide the best design and installation of rainwater drainage system to client. All JAS design and calculations comply with both BS-EN 12056-3 andRIBA NBS R10 standard.

In-House Design

JAS has a technical team that will design JAS Siphonic according to your project needs. The heart of our in-house design lies in providing design, technical advice and customized solutions for each project. Our designers will work with you to design a siphonic roof drainage system that will meet your needs and suit your building conditions.

JAS Calculating Program

JAS calculating program is an accurately designed software. To analyze rainwater drainage system. It is continually developed for 35 years, and its calculation has been installed in more than 35,000 systems worldwide.

Cost-Effective & High Efficiency

Our designs are concerned with cost-effectiveness and high efficiency outcomes. We try to minimize budget while providing a high efficiency system that can take the highest rainfall in each area. Also, all the materials that we use are qualified and will last longer than 50 years.

Site Management and Training

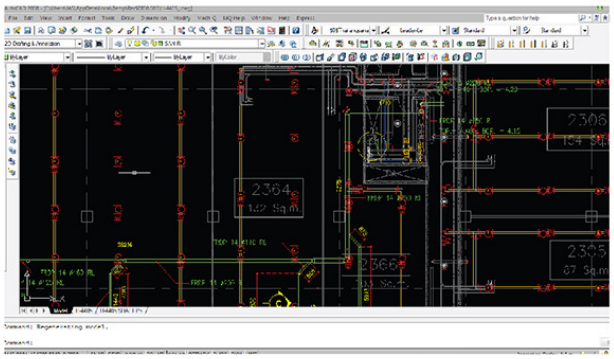
For turnkey project install, our qualified JAS engineering team will supervise, site manages and train operating staffs in order to perform future maintenance.

Turnkey Installation Services

JAS is well qualified to provide turnkey installation services. It is another alternative for the owner with many benefits and high confidence.

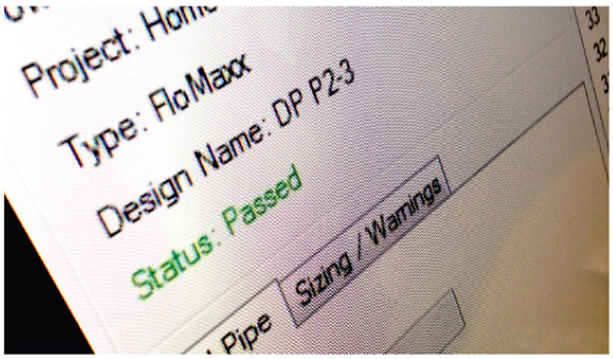
Step 1

Collecting data, planning the outline



Step 2

Combining our design with other systems



Step 3

Design with specific detail of JAS calculating program

Step 4

Install rainwater drainage system

Step 5

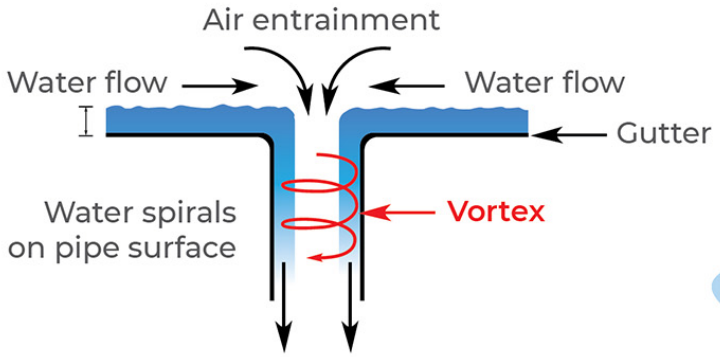
Testing and Quality control process

Step 6

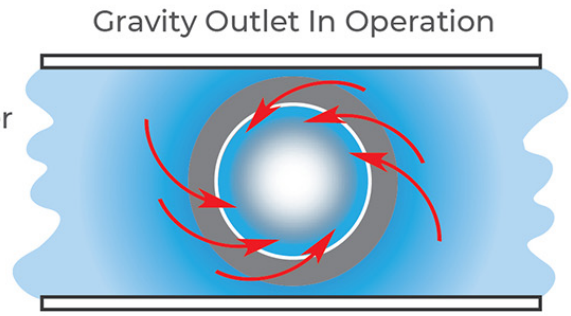
Summit project with As-Built Drawing, engineering calculation worksheets and JAS maintenance manual.

Traditional Gravity Drainage System

SIDE VIEW



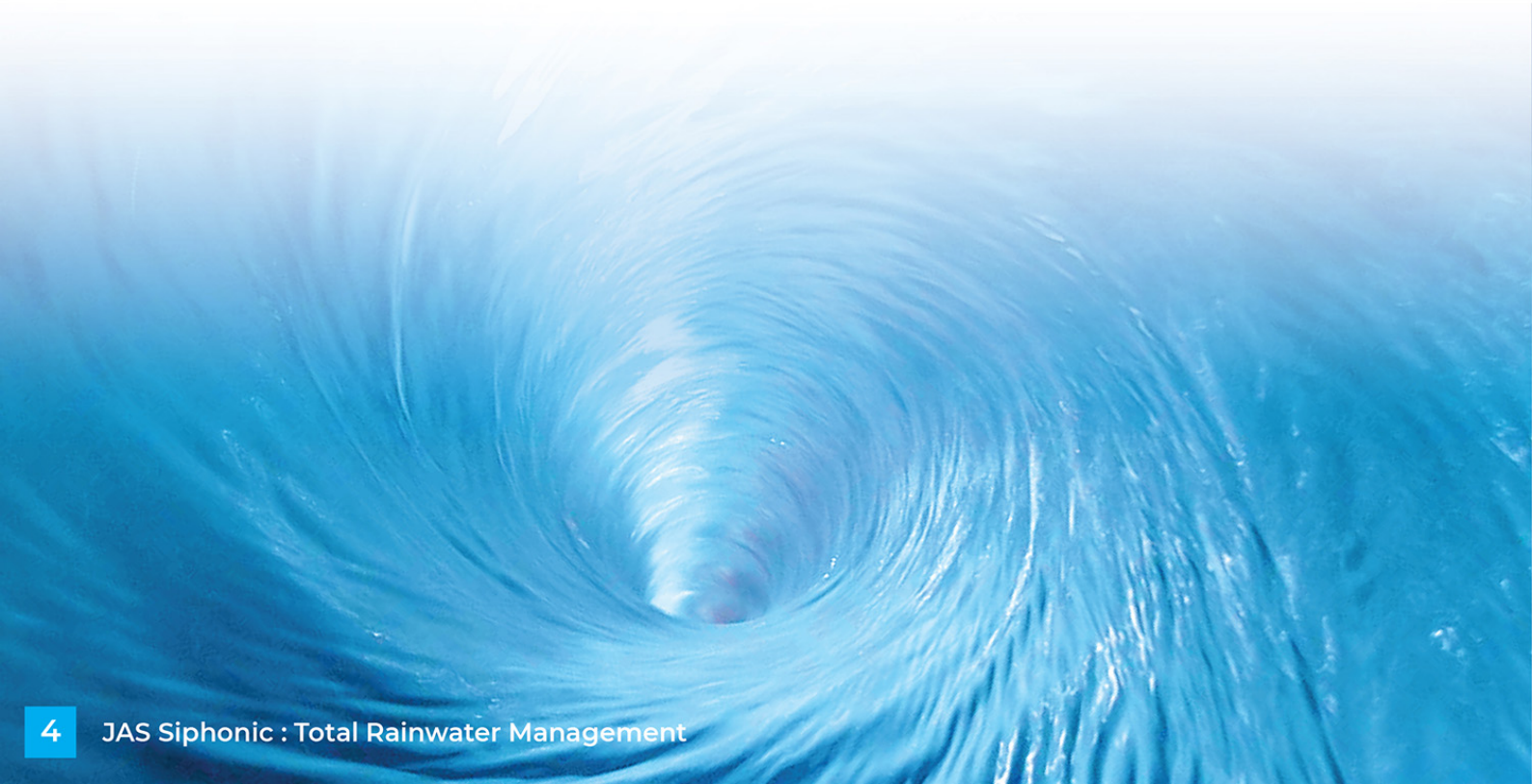
TOP VIEW



Traditional System

In a traditional gravity drainage system, rainwater it drains from gutter into downpipe,The pipe carries both air and water, creating "Vortex", air-filled core down the center of the water flow. Two thirds of pipe is made up of air and just only one third of pipe is water. This results in an extremely inefficient drainage.

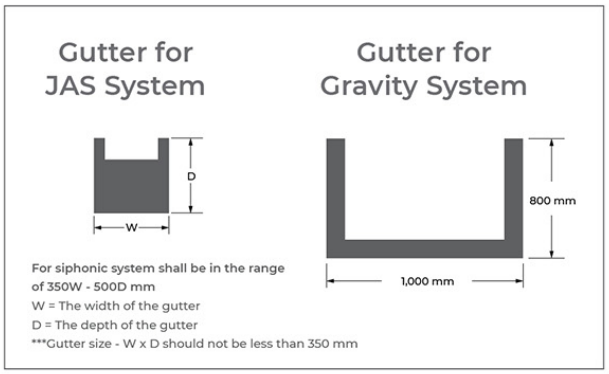
In addition, traditional outlet is often blocked by rubbish which makes flow even more inefficient.



Limitation of Traditional Gravity Drainage System

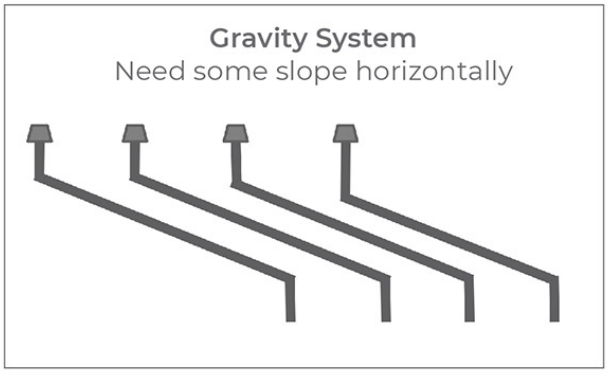
1. Pipe Size

Due to the low flow rate, blocking problems caused rubbish, dust, leafs, larger pipe diameters are required to allow the gutters to drain quickly.



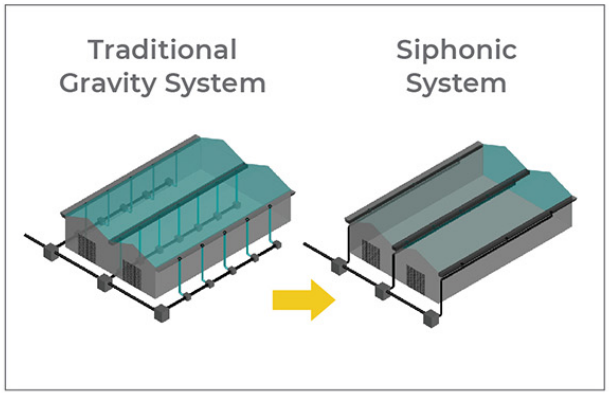
2. Gutter

Because of the low capacity of drainage in traditional system, a big size gutter is required which means more structure supports is and higher budget.



3. Slope

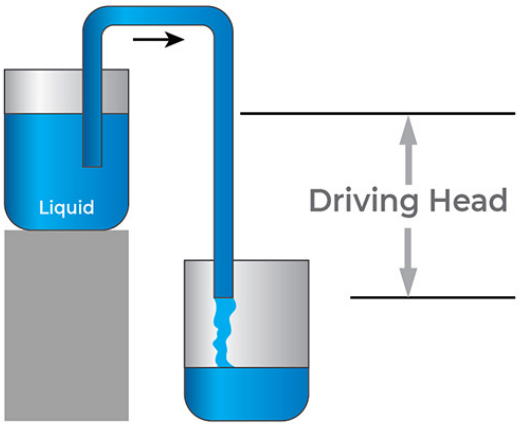
As the traditional drainage system is requires slight slope to drain water. Therefore the discharge points should not be located too far from the outlet and downpipe. Sloping of the main pipe also requires which results in more space to be used and This creates some limitation of design.



4. Downpipe

It's necessary to have many downpipes in the gravity system, and this more manholes. This means higher cost and more maintenance effort.

Siphonic Drainage System



Basic Siphon Principle

PARS
(Pressure Assisted Rainwater System)

Siphonic drainage system is very simple can be described as the working principle of Siphon as a tube or pipe that allows liquid to flow from the higher level to the lower level.

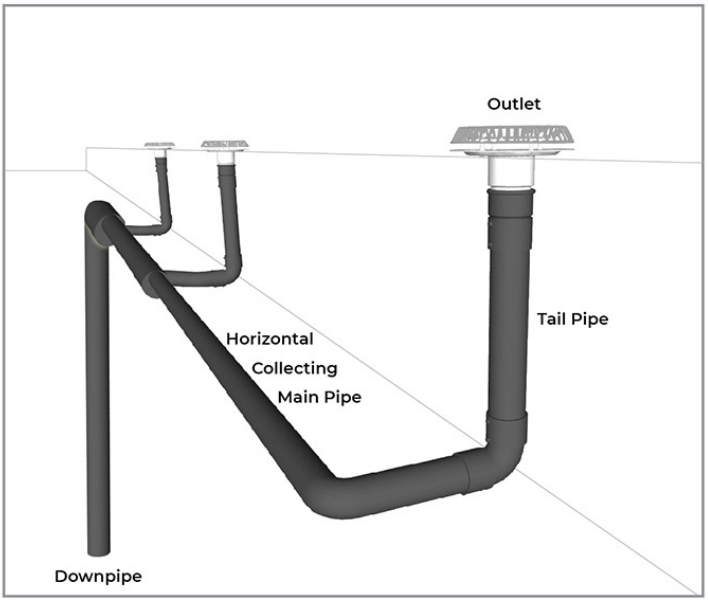
The diagram shows from Driving Head Which is the source of energy that makes the fluid flow through the tube/pipe with high velocity.

JAS Outlets

Siphonic system is designed to eliminate air in the system, in order to increase the efficiency of flow. Outlets are specially designed to restrict the formation of “Vortex” above the outlet. Once water enters into tail pipes, it becomes full – bore flow at high velocity. This increase flow capacity thus requires fewer and smaller downpipes.

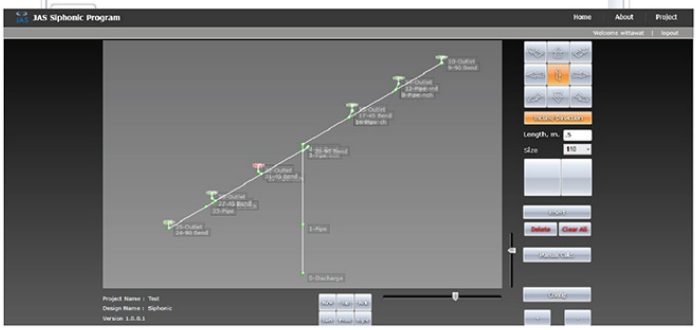
JAS Calc® Siphonic Software

When full-flowing water enters into horizontal collecting main pipe it will drain into the downpipe. The driving head, distance between tail pipe and downpipe, is a potential factor to make the water bruns down. Then, the full flow water continually flows into the discharge point.

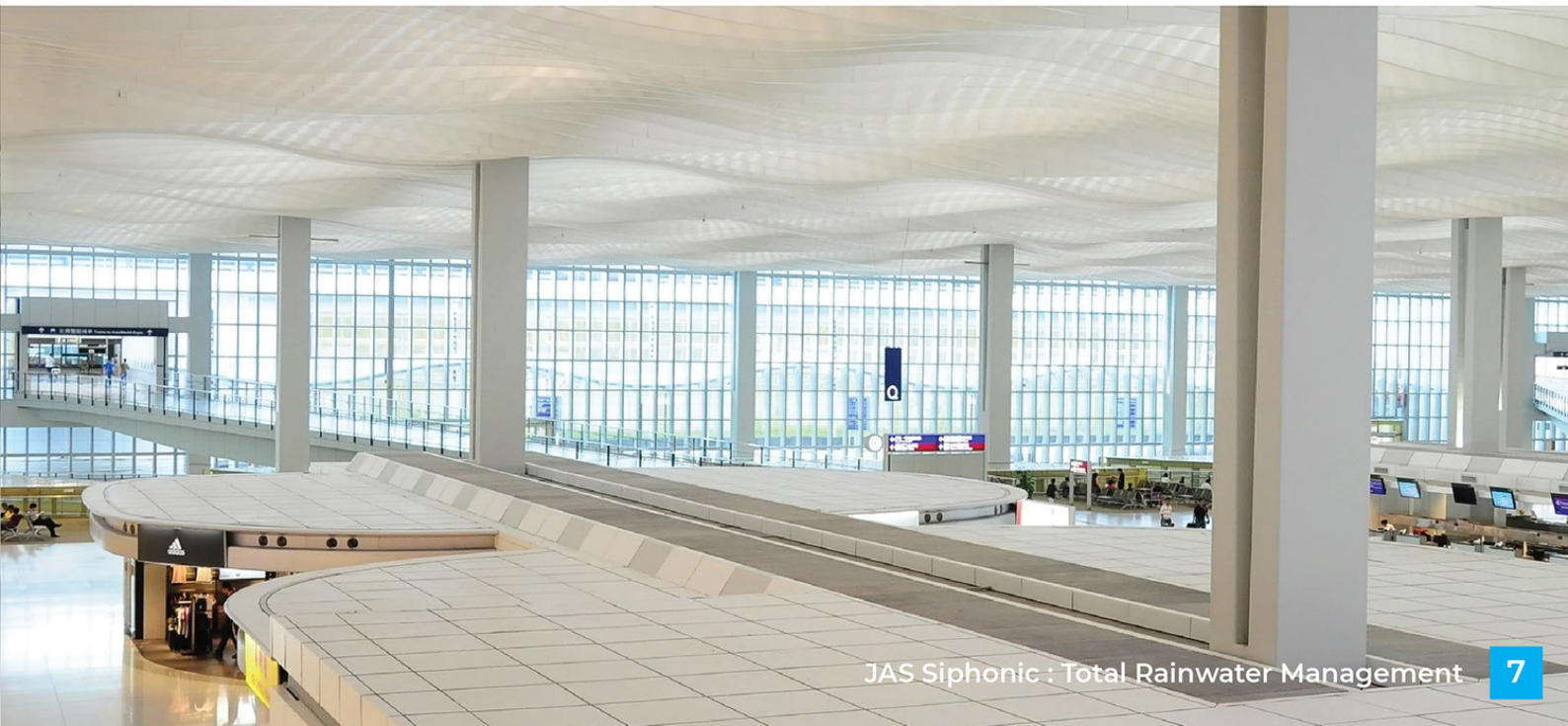


Design : 1344 Siphonic

No. US / DS	Direction	Length	Size	Water	Velocity	P Head	Reserved	Fitting
S8 / 57	+Z		125	20.00	1.92	-0.24	0.28 (2.46%)	Outlet
S7 / S8 S6	+Z		125	20.00	1.92	-0.31		Reducer
S6 / S7 S5	+Z	0.50	75	20.00	5.35	-1.38		Pipe
S5 / S6 S4	+Z		75	20.00	5.35	-1.89		45 Bend
S4 / S5 S3	-X+Z	0.50	75	20.00	5.35	-1.83		Pipe
S3 / S4 S2	-X+Z		75	20.00	5.35	-1.97		Reducer
S2 / S3 39	-X+Z		90	20.00	3.70	-1.63		Branch
S1 / S0	+Z		125	20.00	1.92	-0.24	0.18 (1.59%)	Outlet



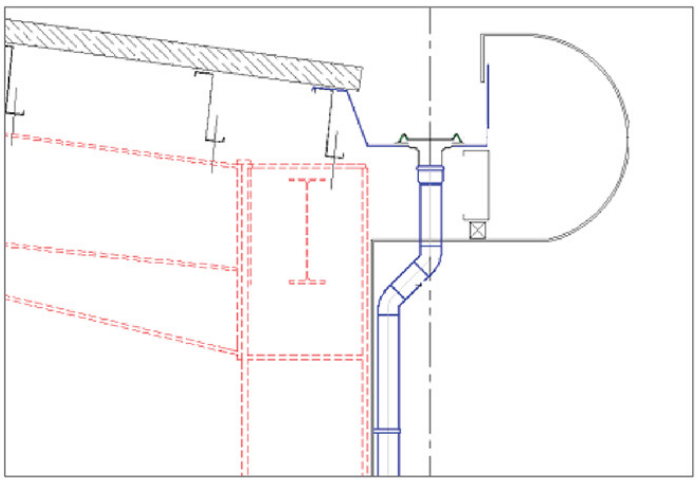
For the calculating process, we will use JAS's Calc software to balance the flow and sizing pipes based on Bernoulli's and Colebrook-White's Principle.

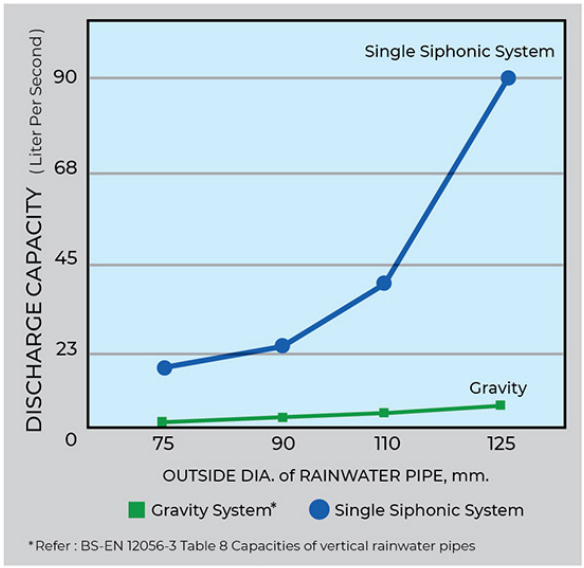


JAS Siphonic Product Range

1. Single-Outlet Siphonic System (Stack)

Single stack siphonic system is more likely to use when there is no condition of the position and amount of downpipe requirements. A major advantage is that the position of downpipes can be placed anywhere with an exact amount of water passes through each outlet as required, the reduction in pipe diameter sizes, and using less amount of downpipes than the gravity system.





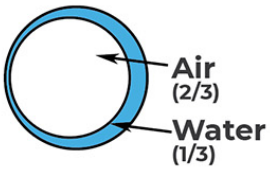
Flow Comparing Between Gravity System & Single Stack System

HDPE Pipe O.D. (mm.)	Discharge Capacity (lps)*	
	Gravity** With Leafguard Outlet	Single Siphonic System**
75	1.65	16.50
90	2.68	25.50
110	4.57	40.70
125	6.44	90.00

* Liter/Second
** at 5 meter head
** Refer : BS-EN 12056-3 Table 8 Capacities of vertical rainwater pipes

Pipe Cross Section

Gravity Flow



Siphonic Flow

Smaller pipe size but much higher flow rate

Traditional Gravity System

A gravity system is designed to operate at atmospheric pressure. When the water flowing in the downpipe it spirals the inner of the pipe (Vortex), and there is an air-filled core down the center of the water flow, resulting in an inefficient of drainage. To be able to drain the water quickly without the risk of overflowing it is necessary to increase the pipe diameters and the number of downpipes.

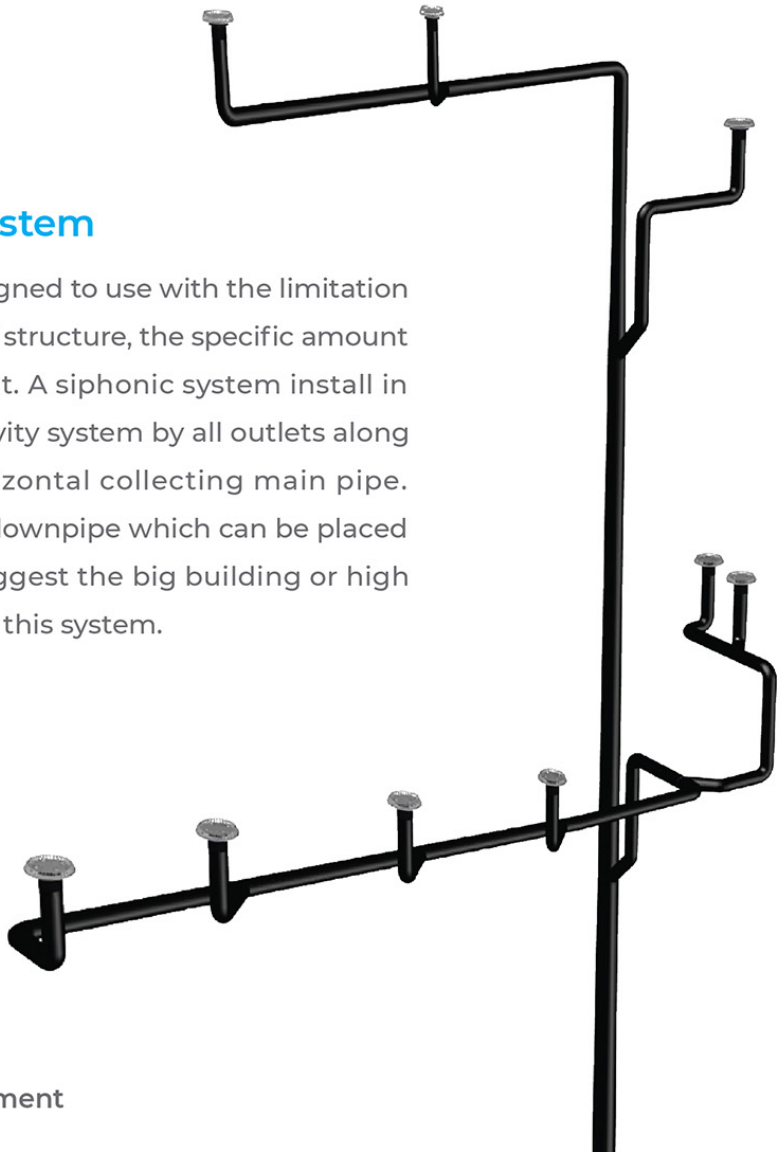
JAS' Stack System

JAS single stack system is designed to make the most advantage from pipework. When the process of the pipe filling with water. Once full of water it will be primed, and siphonic action will occur. This will lead to the full bore flow action with high velocity that can drain the water so quickly. Having a very high velocity in pipe system will also make the self-cleaning function work, eliminate overflow problems and reduce the need of downpipes.

JAS Siphonic Product Range

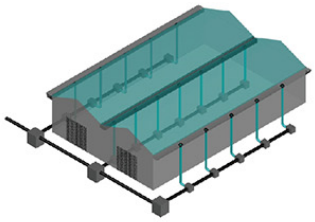
2. Multi-Outlets Siphonic System

A Siphonic roof drainage system is designed to use with the limitation of design such as the complexity of roof structure, the specific amount and position of downpipe requirement. A siphonic system install in a fundamentally different way to a gravity system by all outlets along the gutter are connected with a horizontal collecting main pipe. Then the water will drain into a single downpipe which can be placed in a location desired. However, we suggest the big building or high runoff roof area is more appropriate for this system.



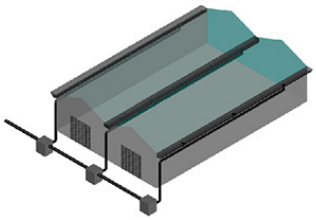
Less Downpipe

Traditional Gravity System



Lots of downpipe, lots of manhole
and underground pipe

Siphonic System

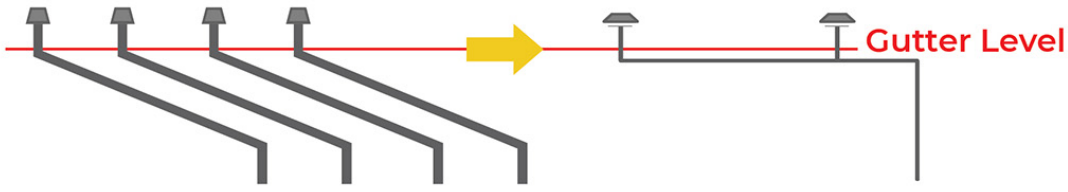


Minimal downpipe, no manhole,
no under ground pipe inside of building

More Height Clearance

Gravity System
Need some slope horizontally

Siphonic System
No Slope needed/ fewer outlets/
less downpipe/ smaller pipe size

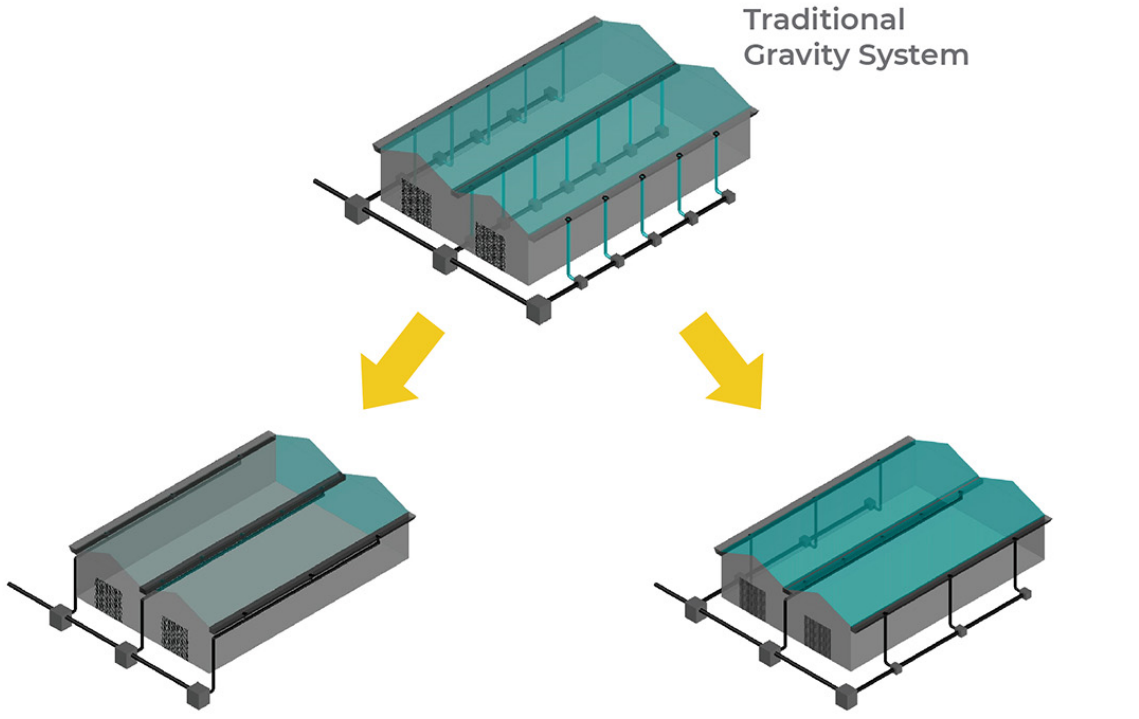


A traditional gravity system consists of a network of collection gutters connected, via open outlets to vertical downpipes. There are slopes and manholes required which mean need more space and underground work for installation. In contrast, a siphonic system is designed to connect the outlets within a horizontal collecting pipe, when it's priming the water flows into downpipe. This drainage solution will provide an efficient way of flow with many benefits such as reduce a space taken, flexible downpipe position, and requires only a minimum amount of maintenance. Moreover, due to a high velocity generated within the syphonic system, the water can be directed to rainwater tank in a convenient location that far away from building.

Combined System

Combined system is another drainage solution for your building. To be able to support a wide variety of buildings, combined system may be used to fit any building configurations.

- Use multi-outlets system to eliminate the underground work.
- Use single-outlet system for the specific location required.



Pipes and Fittings for Siphonic Drainage System
(RIBA NBS R10 standard)

The HDPE high density polyethylene pipes is the ideal of siphonic drainage system to meet the RIBA-NBS R10 standard. They are lightweight with rapid joint by electo-welding. We highly recommend because of the ability to withstand higher negative pressures than PVC pipes, offer excellent performance and durability with high weather, UV and corrosion resistance.

PVC pipes are inexpensive. They are light and easy to joint. On the downside they are easily damaged, breakable, pretty flimsy and less ability to withstand negative pressures than HDPE.

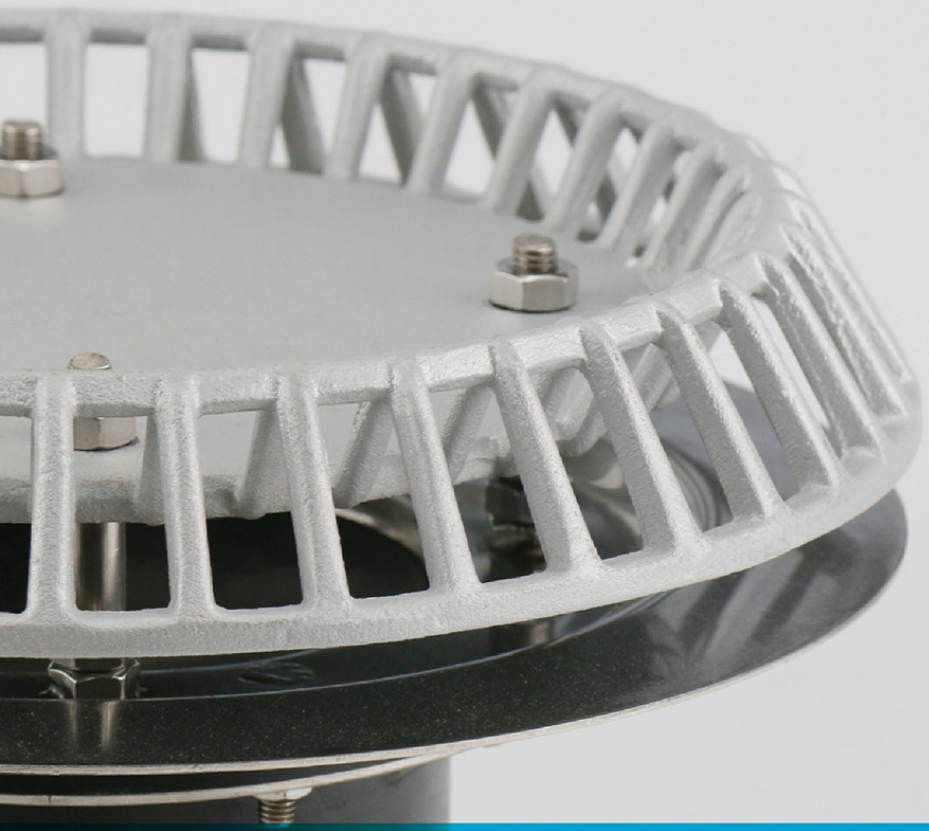
11.5 Plastics (PVC-U)
Gutters and round downpipes for external use are covered by BS EN 607, BS EN 1462 and BS EN 12200-1.
Sealed pipework for internal use is covered by the same standards as foul drainage pipes, BS 4514 and BS EN 1329-1. These standards are also appropriate where external pipework needs to be sealed.
Plastics rainwater systems are inexpensive, light and easy to fix, and require little routine maintenance if correctly installed.
They are however relatively flimsy and can be damaged by accidental impacts (e.g. by window cleaners), climbing or vandalism. Internal downpipes will need intumescent sleeves (see section P12) and steel brackets if passing through fire resisting

11.6 Plastics (HDPE)
High density polyethylene (HDPE) pipes are extensively used for below ground potable water supplies (blue) and gas pipelines (yellow). Black pipes for drainage can be specified using BS EN 1519-1.
HDPE pipes, with machine fusion welded joints, are common in siphonic and pressure-assisted rainwater systems because of their wide range of diameters, lightness, strength and ability to withstand higher pressures than PVC-U pipes. They have high impact and abrasion resistance, and a thicker pipe wall than PVC-U pipes of comparable diameter. HDPE pipes are rarely used in conventional (gravity) rainwater systems. See also note on fire precautions in 11.5 if penetrating fire resisting constructions.
Thermal movement is large and can be accommodated using anchor and guide brackets or rail suspension systems.

RIBA : Royal Institute of British Architects

NBS : National Building Specification

JAS SIPHONIC
ROOF DRAINAGE



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