Quotation for the supply of Rainwater Harvesting Equipment

Client :

Jeremy Fletcher
MTC Engineering (Cambridge) Ltd

Site Reference :

Combined Rain Activ for
Land at 1Toll Bar Lane, Keyston. PE28 0RB

Prepared by:

Ian Woodcock

ianw@rainwaterharvesting.co.uk

01733 405104 / 07736 45 46 45

Our reference : IMW223296

Date of proposal : 07/02/2025

Your Proposal

Thank you for your email containing additional information and as requested please find the following information regarding our proposed system.

SHALLOW DIG F-LINE TANK	
	5000
Weight Kg	250
Length	2960
Width	2220
Overall Height	1750
Ground to Invert BS60 (Vehicle Loading Shaft)	**745**
Minimum Attenuation Volume	**2100 litres**
Invert to Outlet	**548**

EXCAVATION	
Length	3360
Width	2620
Overall height BS60	1850

Overall height allows for 100mm compacted aggregate

The system below has been upgraded with a vehicle loading shaft and lid

Please see Drainage Calculation Summary on page 10

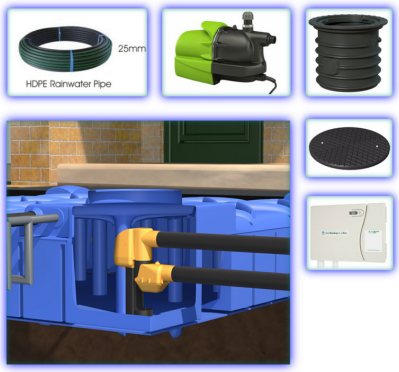
Rainwater Harvesting Limited is a private family owned company, our strong service ethos has been built on many years of experience and this is reflected in our ability to offer both simple to install rainwater harvesting systems and mix and match components to provide bespoke solutions reflecting clients needs. At our 100,000sq ft warehouse in Peterborough we hold over 3000 stock items, we are the largest stockholder of the Shallow Dig Rewatec tanks in the UK and we regularly despatch to site complete rainwater harvesting systems within 5-7 days of order, we also provide full technical support on all our products.

We would welcome the opportunity of supplying your rainwater harvesting system and I can easily be contacted either by phone or email as shown on the previous page

Components and Prices – Supply Only

Product Code **: RWH-5099FL-RA/DUK2**

5,000 Litre Combined Rainwater Harvesting & Rain Activ Controlled Attenuation System



Components

Product Code	Description	Qty
RWFT5000	F-LINE 5000L TANK	1
RWDS0059	F-LINE STEEL COVER AND SHAFT - BS60	1
RWH-RV01	RAINVANTAGE FILTER KIT INC SIPHON & OVERFLOW	1
RWH-RA02	**RAIN ACTIV SUDS COMPONENT SITE SPECIFIC AND PRE FITTED ALLOWING FOR 2900 LITRES OF RAINWATER HARVESTING AND A MINIMUM OF 2100 LITRES WORTH OF ATTENUATION WITH A CONTROLLED DISCHARGE RATE OF 0.8 LITRES PER SECOND**	1
RWH-RA01	MICRO DRAINAGE CALCULATIONS	
RWH-HYD04	HYDROFORCE SERIES 4 PUMP / INC STRAINER	1
RWH-HDPE25/25	25mm HDPE RAINWATER PIPE - 25m ROLL	1
RWH-PKFLINE-GDN	FLINE INSTALLATION PACK GARDEN / INC LABELS & 90° ELBOW	1
RWH-BUB03	RAIN BACKUP IN A BOX / SD	1

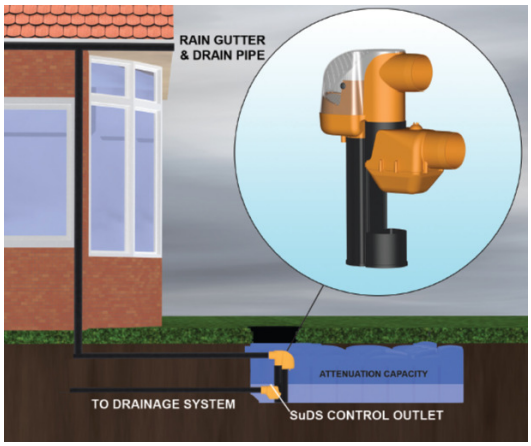
Price : £3,275.00 (£3,930.00 Inc. VAT)

UK delivery is included in the price (Highlands and islands extra)

Rain Activ SuDS Solution

Rain Activ is a totally new concept within the storm attenuation market. Utilising shallow dig underground water tanks as well as a filtration and controlled discharge module.

Rain Activ collects water from the roof and removes debris via a self-cleaning filter. Once inside the tank, the clean water is attenuated and discharged slowly at a calculated rate through an orifice.



- Ultra-low discharge SuDS system.
- Peak discharge rates as low as 0.05 L/sec per property.
- Primary solution reduces secondary SuDS infrastructure and costs.
- Each system individually calibrated to site requirement.
- Can be used in combination with Rainwater Harvesting.

Rain Activ is ideal for sites where low rates of storm water discharge are required. With peak discharge rates as low as 0.05 L/sec, the system provides a solution for applications where flow is typically not sufficient for vortex flow control systems.

By collecting and slowing the water at source, the scale and cost of secondary SuDS infrastructure such as balancing ponds and geocellular storage can be heavily reduced. For many developments this can increase the available land for development.

Where applicable, Rain Activ can be used in conjunction with Rainwater Harvesting by simply adding a pump and management system.

Mains backup and rainwater management

Direct feed with simple, 12v automatic float switch & solenoid valve for mains water backup

Most often used on a direct feed system, the automatic electrically-actuated solenoid valve (or tap) admits some mains water into the rainwater storage tank as a simple means of maintaining water flow to toilets and washing machine fed by a rainwater harvesting system. This method is sometimes referred to as a trickle-feed mains backup.

a) Filtered rainwater flows as normal to the tank



b) The home is plumbed with a separate pipe network for toilets and washing machine.

c) When there is rainwater in the tank the pump supplies rain water to the toilets and washing machine. The principle is the same whether the pump is indoors or submerged in the tank.

d) The pump is a pressure sensitive type or fitted with a pressure-sensitive switch which turns off when water is not being used in the house.

e) When the tank is nearly empty a float switch turns ON a mains-powered solenoid valve which allows some mains water to flow into the rainwater tank.

f) The provision of a “Air Gap” is a regulation requirement. This i) provides a visible warning of water flow if the valve sticks open and ii) prevents any possibility of rain water flowing into the mains (drinking) water. After a few moments the floating switch turns the solenoid valve OFF.

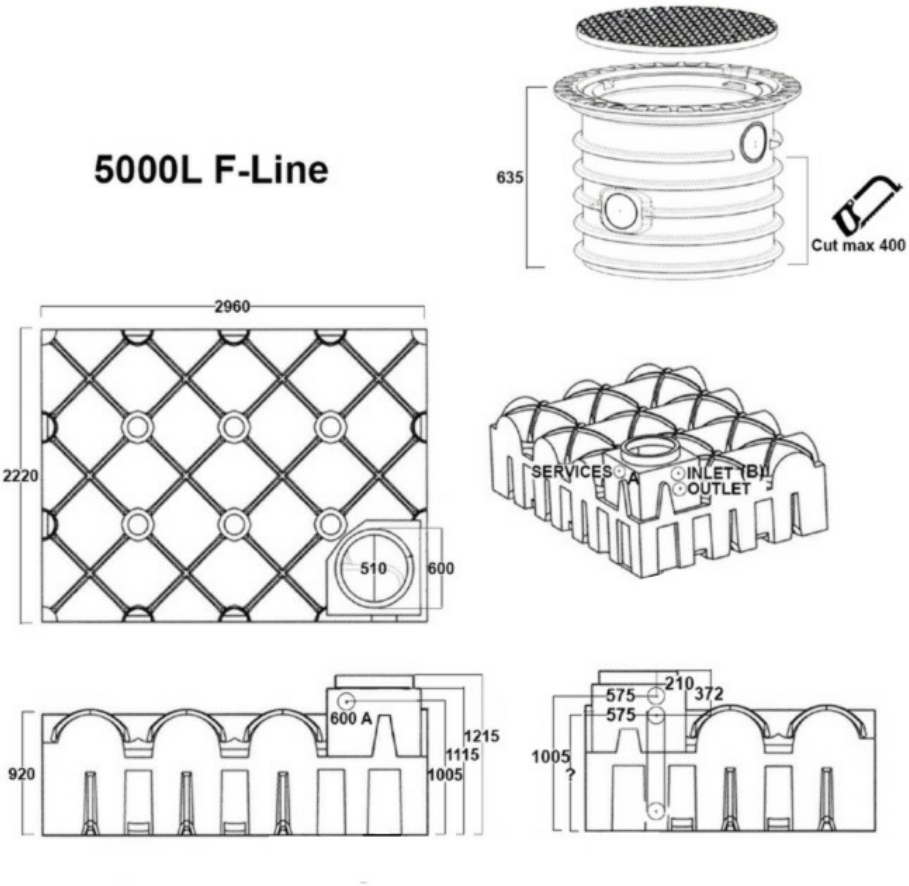
g) Although this simple mains backup can be criticised by some for admitting mains water back into the rainwater tank, it should be pointed out that the tank remains largely empty and can receive new rain water from a downpour at any time.

h) This is sometimes referred to as “trickle feed” because the tank does not get filled up with water; the level is simply lifted to the level (about 10 cms) where the inlet of the pump can draw water when next called upon.

i) There is no risk of rainwater being drawn into the mains water supply so there is no risk of breaching building regulations in this respect.

j) To ease the installation of a variety of components and rather complex wiring, RainWaterHarvesting.co.uk introduced in early 2009 the Rain Backup in a Box® which replaced the higgle piggle of components with a single wall mounted unit, one 12v electric plug to a wall socket, mains water input and a pipe to the underground storage tank. This is supplied as a default with “standard” DUK-2 kits.

5000L F-Line



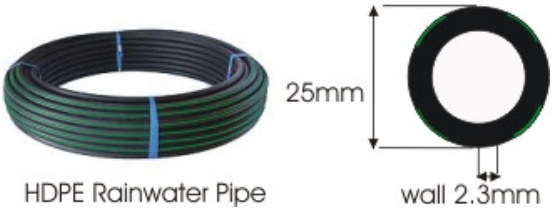
A vehicle loading shaft cannot be cut down

Please check your invert / outlet levels carefully, details can be found on page 2, if the outlet cannot connect to the drains so the system discharges by gravity you will require a pumping station (which we do not supply)

Recommended Rainwater Pipe

Rainwater Pipe in HDPE (High Density Polyethylene) for rainwater use as recommended by Water Authorities is available as an option for all tanks and systems. Black with 4 green stripes and available in both 25mm and 32mm diameter. High quality HDPE.

RainWater Harvesting Limited has worked with the UK Rainwater Harvesting Association and listened to WRAS and several of the water companies, to bring to the market the pipe marked with four green stripes. The identification helps maintenance staff and the end user, after installation, to know which pipes on site carry rainwater (which is non-potable in the UK Building Regs). We stock the following two sizes preferred by contractors fitting rainwater systems.



25mm diameter,
flexible, in 25 or 50m coils
Product ID: RWH-HDPE25/25

Ship weight of one 25m coil: 4.3 kg



32mm diameter,
flexible, in 25 or 50m coils
Product ID: RWH-HDPE32/25

Ship weight of one 25m coil: 5.5 kg

Other sizes available upon request

RAINWATER RAINWATER RAINWATER

Rainwater Harvesting Limited, Unit A Harrier Park, Southgate way, Orton Southgate, Peterborough, PE2 6YQ
Tel : 01733 405111 Fax : 01733 230996 Email : info@rainwaterharvesting.co.uk
www.rainwaterharvesting.co.uk

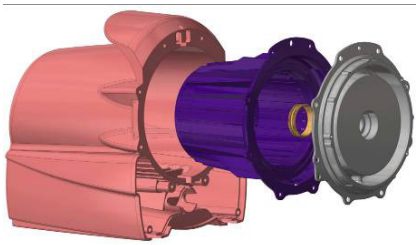
The **Series 4** water pump from HydroForce Pumps Ltd.



The Series 4 pump has been engineered by HydroForce Pumps Ltd in Peterborough to respond to the demand for the highest quality pump for use underwater in rainwater harvesting tanks. Using the most rugged components it has been exhaustively tested for trouble-free running. The pump features a self-controlling pressure switch and dry run protection. It is suitable for total immersion in rainwater or it can be externally connected to the tank above ground. The Series 4 will deliver up to 3.5 bar (household pressure is around 2.5-4.0 bar). If connected to a hose or tap, the pump will automatically start to pump water when the tap or hose is turned on. The pump delivers over 2500 litres per hour using a 1" connector and runs at 230v AC delivered by a 5 metre cable.

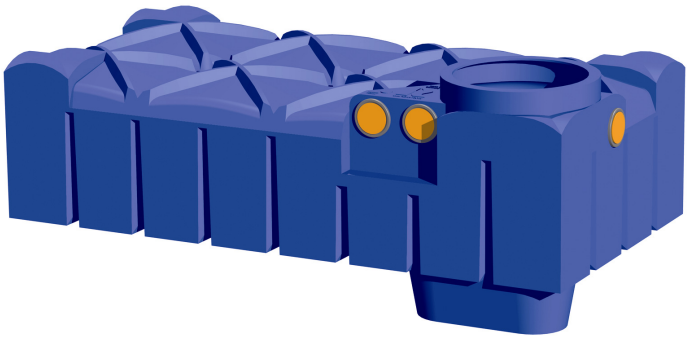
Specifications

- Submersible: for underwater use in a rainwater tank, or can be used above ground
- Extended two year guarantee
- Nominal pump pressure at outlet 3.5 bar
- Max head 35 metres
- Pressure-sensitive (demand) pump: turns itself off until there is demand for water
- Dry-run Protection: when no water is detected for 8 seconds, the pump is turned off in order to protect the motor and pump from burning out. Automatic reset after a period of 30 minutes.
- Radial flow centrifugal roto-dynamic pump with no reciprocating parts
- **New:** Alloy bulkhead, pressure release gap and twin chamber design prevents ingress of water to motor, electrical components and to bearing oil.



- **New:** Double bearing seal prevents egress of bearing oil.
- **New:** Alloy bulkhead dissipates motor heat to water in the second chamber.
- **New:** Logic processors in Series 4 printed circuit board prevent other pump anomalies and permit factory programming of reset timings.
- **New:** Each pump is tested before leaving our factory. Factory measurements are on record for each individual pump. No user-serviceable parts
- Electricity consumption 800 watts at 230 Volts AC 50 Hz (requires 10 or 13 amp fuse and RCD mains socket). Connection cable 10m H07RN-F.
- Dimensions L 565 W 185 H 260 mm, weight 12 kg
- Max suction 8 metres deep, preferable operating regime 4 metres deep
- Inlet port to the non-removable cartridge filter 1 inch (25mm) female BSP
- Outlet port 1 inch (25mm) female BSP provided with push-fit connector for 1 inch (25mm) MDPE pipe.
- Supplied with an inline filter, 1” intake strainer and 1” outlet connection.

F-Line Flat Tank shallow dig underground tank



Why buy this tank?

- The F-Line is a high quality, rotationally moulded, one piece rainwater tank that can be installed without the need for concrete, thereby minimising installation costs and supported by our long term 25 year tank guarantee.
- Minimal installation depth
- Easy and quick to install
- Small excavation pit and little earth excavation preserves your garden
- Ideal for installation in new or existing properties
- Can be installed in ground water up to tank shoulder
- Easy to install

The F-line flat tank can be installed into much higher water tables than a standard round tank. If you don't know what your water table will be like in the winter, you're safer to install a flat tank. The F-Line tanks are flat and the installation depth is up to 60% less than other rainwater tanks. The excavation can be up to 70% less, meaning little earth excavation, easy handling and less cost for you! The small excavation pit is easily filled in and your garden will look just like it did before.

Drainage Calculation Summary

The calculations below have been based on the following criteria:

1:100 Year Storm Event

40% Climate Change

Geographical Location; Land at 1 Toll Bar Lane, Keyston PE28 0RB

Total impermeable area = 80 sqm

We have run the Micro Drainage Calculations (see pages below) and designed a site specific system as follows;

- 5000L tank with a 20mm orifice, providing 2900 litres of rainwater harvesting for re-use and a minimum of 2100 litres of attenuation with a peak discharge of 0.8 l/s

- The highest stress put on the system was during the 1:100 year (+40%), 60 minute winter storm.

- Various other events were trailed; (38 in total) all at or below a peak discharge of 0.8 l/s

The reason we can use a very small orifice (between 5-44mm) without risk of blockage is because;

- High quality pre filtration, removing any particles larger than 1000 micron. *(So nothing larger than 1mm can enter the tank.)*
- The filter is self cleaning but does require an annual check for any major debris. As detailed in the maintenance guide.
- The orifice and filter have been developed for simple auditing. (Remove the manhole and look directly below to check for blockage.)

THE SITE SPECIFIC CALCULATIONS BELOW ARE BASED SPECIFICALLY ON OUR TANKS AND SuDS MODULE, THEY ARE NOT VALID FOR ANY OTHER SOLUTION

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	0.307	0.307	0.7	0.0	0.7	1.6	O K
30 min Summer	0.349	0.349	0.8	0.0	0.8	1.8	O K
60 min Summer	0.359	0.359	0.8	0.0	0.8	1.9	O K
120 min Summer	0.325	0.325	0.7	0.0	0.7	1.7	O K
180 min Summer	0.285	0.285	0.7	0.0	0.7	1.5	O K
240 min Summer	0.250	0.250	0.6	0.0	0.6	1.3	O K
360 min Summer	0.196	0.196	0.6	0.0	0.6	1.0	O K
480 min Summer	0.159	0.159	0.5	0.0	0.5	0.8	O K
600 min Summer	0.132	0.132	0.5	0.0	0.5	0.7	O K
720 min Summer	0.111	0.111	0.4	0.0	0.4	0.6	O K
960 min Summer	0.084	0.084	0.4	0.0	0.4	0.4	O K
1440 min Summer	0.054	0.054	0.3	0.0	0.3	0.3	O K
2160 min Summer	0.035	0.035	0.2	0.0	0.2	0.2	O K
2880 min Summer	0.027	0.027	0.2	0.0	0.2	0.1	O K
4320 min Summer	0.022	0.022	0.1	0.0	0.1	0.1	O K
5760 min Summer	0.019	0.019	0.1	0.0	0.1	0.1	O K
7200 min Summer	0.017	0.017	0.1	0.0	0.1	0.1	O K
8640 min Summer	0.015	0.015	0.1	0.0	0.1	0.1	O K
10080 min Summer	0.014	0.014	0.1	0.0	0.1	0.1	O K
15 min Winter	0.349	0.349	0.8	0.0	0.8	1.8	O K
30 min Winter	0.396	0.396	0.8	0.0	0.8	2.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	134.715	0.0	2.0	0.0	16
30 min Summer	87.677	0.0	2.6	0.0	25
60 min Summer	54.368	0.0	3.3	0.0	42
120 min Summer	32.619	0.0	3.9	0.0	76
180 min Summer	23.901	0.0	4.3	0.0	108
240 min Summer	19.071	0.0	4.6	0.0	140
360 min Summer	13.769	0.0	5.0	0.0	202
480 min Summer	10.943	0.0	5.2	0.0	262
600 min Summer	9.148	0.0	5.5	0.0	322
720 min Summer	7.899	0.0	5.7	0.0	382
960 min Summer	6.262	0.0	6.0	0.0	502
1440 min Summer	4.507	0.0	6.5	0.0	736
2160 min Summer	3.240	0.0	7.0	0.0	1100
2880 min Summer	2.561	0.0	7.4	0.0	1444
4320 min Summer	1.836	0.0	7.9	0.0	2200
5760 min Summer	1.449	0.0	8.3	0.0	2896
7200 min Summer	1.205	0.0	8.7	0.0	3576
8640 min Summer	1.036	0.0	9.0	0.0	4392
10080 min Summer	0.912	0.0	9.2	0.0	5048
15 min Winter	134.715	0.0	2.3	0.0	16
30 min Winter	87.677	0.0	2.9	0.0	26

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow Σ (l/s)	Max Volume (m³)	Status
60 min Winter	0.399	0.399	0.8	0.0	0.8	2.1	O K
120 min Winter	0.343	0.343	0.8	0.0	0.8	1.8	O K
180 min Winter	0.285	0.285	0.7	0.0	0.7	1.5	O K
240 min Winter	0.238	0.238	0.6	0.0	0.6	1.2	O K
360 min Winter	0.170	0.170	0.5	0.0	0.5	0.9	O K
480 min Winter	0.128	0.128	0.5	0.0	0.5	0.7	O K
600 min Winter	0.100	0.100	0.4	0.0	0.4	0.5	O K
720 min Winter	0.081	0.081	0.4	0.0	0.4	0.4	O K
960 min Winter	0.057	0.057	0.3	0.0	0.3	0.3	O K
1440 min Winter	0.035	0.035	0.2	0.0	0.2	0.2	O K
2160 min Winter	0.026	0.026	0.2	0.0	0.2	0.1	O K
2880 min Winter	0.022	0.022	0.1	0.0	0.1	0.1	O K
4320 min Winter	0.018	0.018	0.1	0.0	0.1	0.1	O K
5760 min Winter	0.015	0.015	0.1	0.0	0.1	0.1	O K
7200 min Winter	0.014	0.014	0.1	0.0	0.1	0.1	O K
8640 min Winter	0.012	0.012	0.0	0.0	0.0	0.1	O K
10080 min Winter	0.011	0.011	0.0	0.0	0.0	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
60 min Winter	54.368	0.0	3.7	0.0	46
120 min Winter	32.619	0.0	4.4	0.0	82
180 min Winter	23.901	0.0	4.8	0.0	114
240 min Winter	19.071	0.0	5.1	0.0	148
360 min Winter	13.769	0.0	5.5	0.0	210
480 min Winter	10.943	0.0	5.9	0.0	270
600 min Winter	9.148	0.0	6.1	0.0	328
720 min Winter	7.899	0.0	6.4	0.0	388
960 min Winter	6.262	0.0	6.7	0.0	502
1440 min Winter	4.507	0.0	7.3	0.0	738
2160 min Winter	3.240	0.0	7.8	0.0	1100
2880 min Winter	2.561	0.0	8.3	0.0	1416
4320 min Winter	1.836	0.0	8.9	0.0	2180
5760 min Winter	1.449	0.0	9.3	0.0	2936
7200 min Winter	1.205	0.0	9.7	0.0	3576
8640 min Winter	1.036	0.0	10.0	0.0	4328
10080 min Winter	0.912	0.0	10.3	0.0	5136

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.200	Shortest Storm (mins)	15
Ratio R	0.423	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.008

Time (mins) From:	To:	Area (ha)
0	4	0.008

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Model Details

Storage is Online Cover Level (m) 1.000

Tank or Pond Structure

Invert Level (m) 0.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	5.2	0.755	5.2	0.756	0.0

Orifice Outflow Control

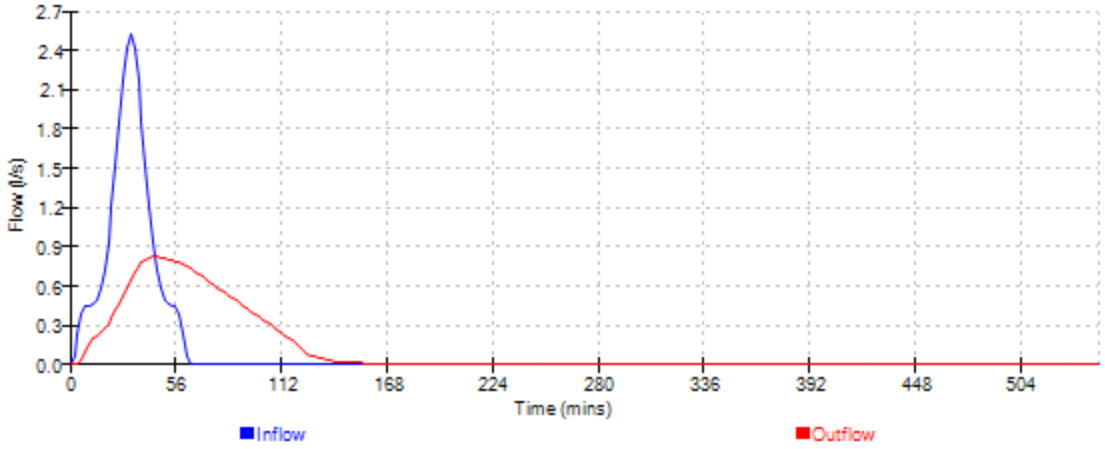
Diameter (m) 0.020 Discharge Coefficient 0.950 Invert Level (m) 0.000

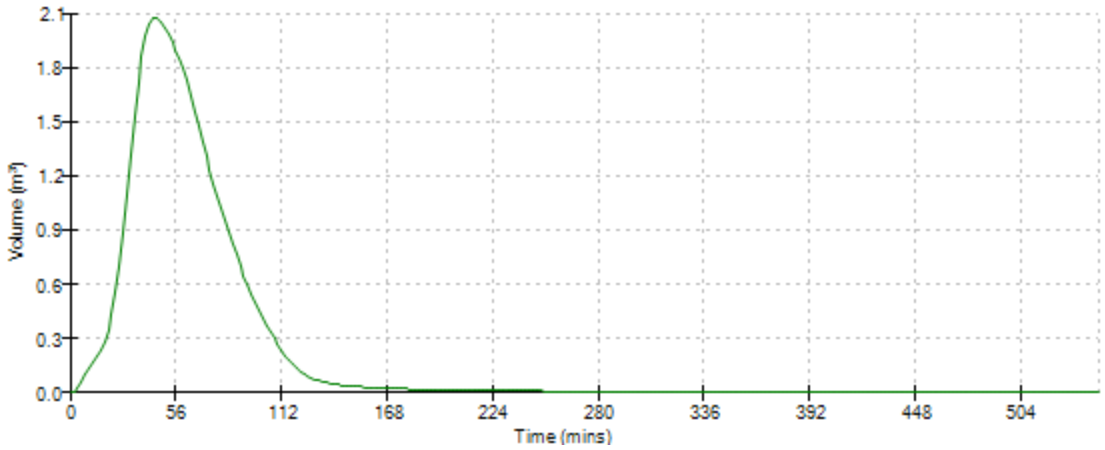
Orifice Overflow Control

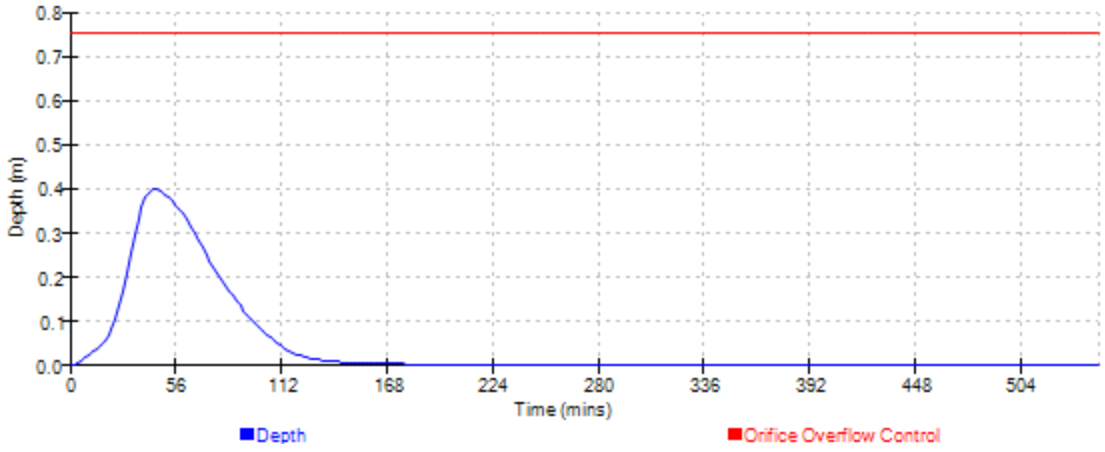
Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 0.754

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Event: 60 min Winter





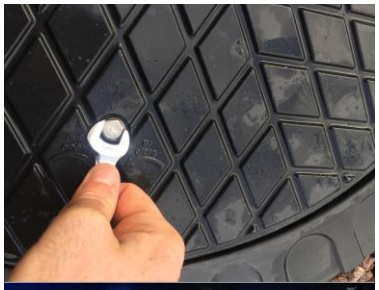


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Rain Activ maintenance schedule.

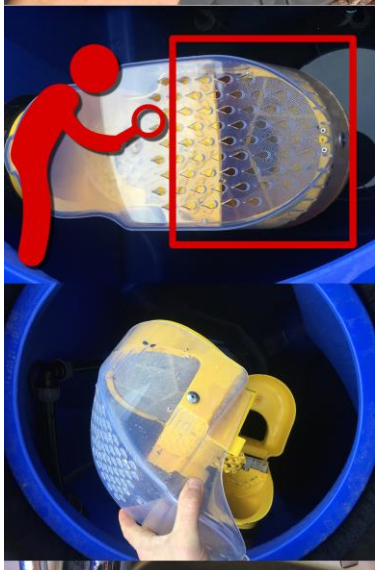
Filter: *Warranty 2 years. Expected service life 100 years.*

Self cleaning filter with 1000 micron screen.



Every 6 months. Visually check the filter for larger blockages.

1. Release child locks on the lid. (13mm bolt).



2. Inspect filter for visible large blockage.
If large or non moving debris is found refer to stage 3. Is none is found refer to stage 6.

NB: Small debris will we periodically self cleaned during storms. Leaves, moss and other smaller debris will self clean and do not require removing unless obvious they are causing a blockage.

3. (If a blockage has been found) Remove filter lid.



4. Remove debris, wash filter head under a tap.



5. Replace filter head.

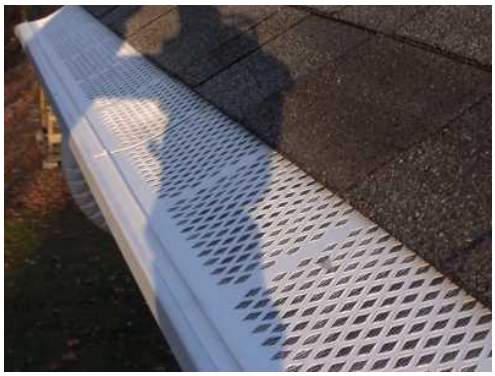


6. Replace lid, ensure 13mm child safe locks are tight.

Risk if neglected: Very low, possible reduction of filter efficiency. Reduction in quality of water for rainwater harvesting.

NB: the filter is fully self cleaning under normal conditions. Only abnormal or large debris from gutters can cause a blockage.

Maintenance frequency can be reduced by adding additional leaf and debris guards to gutters. Dependant on the quality of guarding and location, maintenance intervals can be reduced to 12, 18, or 24 months.
Examples of gutter guarding systems.





F-Line Tank. *Warranty 25 years. Expected service life 100 years.*

Every 10 years. Pump out completely and clean sidewalls with pressure washer, pump out using dirty water pump. (Around 0.5cm of very fine silt builds per year.)
Risk if missed: Low, potential reduction in water quality for rainwater harvesting. If missed multiple times (circa 50 years), potential blockage of outlet orifice.



Gutters: N/A

Clean every 10 years to reduce strain on self cleaning filter. Remove all leaf matter, moss, debris. Wash through.
Risk if missed: Very low, increased fine sediment entering the tank.