



Domestic Rainwater Harvesting systems

Mains backup and rainwater management options

In the past there have been two ways of ensuring that mains water is admitted to the washing machine and toilets if the rainwater runs out,

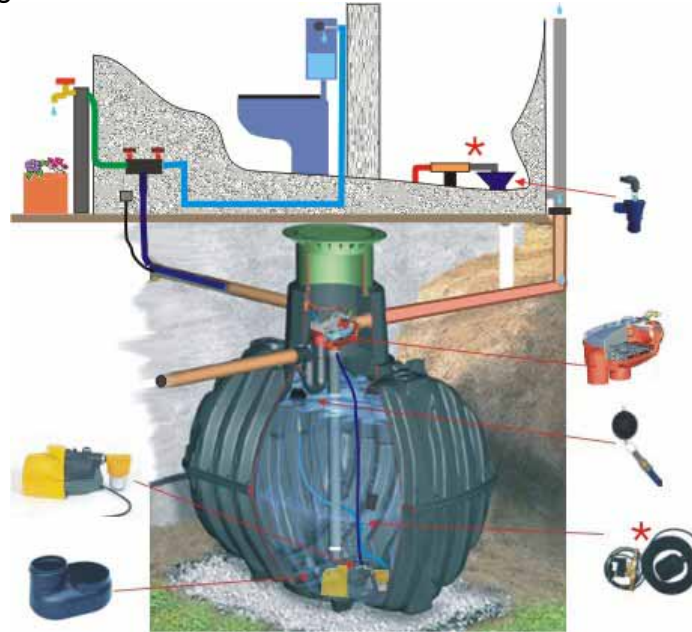
- (a) the float switch and solenoid valve and
 - (b) the Rain Manager (and variants from several manufacturers).
- Since the introduction of
- (c) the Rain Director® in 2008 there are now three options.

This paper describes each of the options and enlarges on pricing and info provided in a quote from RainWaterHarvesting.co.uk or the web site. It also serves as a “primer” for home-owners or professionals wishing to understand better how a rainwater harvesting system works.

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a) Simple, automatic float switch & solenoid valve for mains water backup

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. The illustrations show a system from Graf, but the principles are the same in other domestic systems. Use this option when working to a budget as the saving is about £500.



- 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 draws rain water from the floating input to the toilets and washing machine. The principle is the same whether the pump is indoors (left) or submerged in the tank (right, the quieter option).
- d) The pump is a pressure sensitive type or fitted with a pressure-sensitive switch (or “flow controller”) 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. The float switch and solenoid valve can be purchased separately (RT-Z-NS in 15 or 25 metre cable length).
- f) “Air gap” regulations require that a tundish (as shown at the top of the light blue pipe just below 6, and inset right) be fitted below the valve. 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 mains tap 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 rainwater from a shower at any time.
- h) We refer to this as “trickle feed” because the tank does not get filled up with water; the level is simply lifted to the level where the floating input for 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.



2) “Rain manager” mains backup and rainwater management systems

“Rain managers” include the Rain Manager from Regen-tec and similar products (PowerRain, Super Rain Basic, Super Rain II etc) from other manufacturers. Rain managers add another level of sophistication for when the rain water runs out. In this case, no mains water is released into the rainwater tanks.

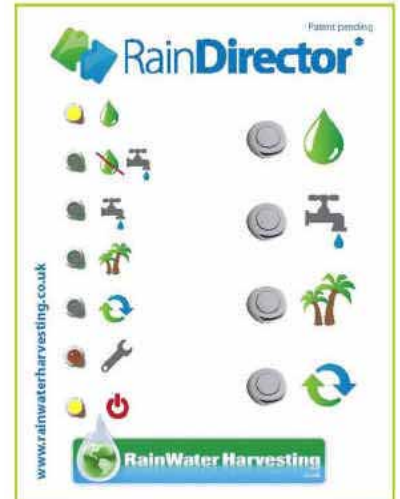
- a) All elements of the system are in one housing which should be fitted on the ground floor (or cellar) of the home.
- b) Instead of putting mains water into the rainwater collection tank when empty, a rain manager tops up a small water header tank, contained within the housing.
- c) The refill system is controlled either
 - a. by a float switch in the rainwater storage tank, or
 - b. an electric sensor for example in the case of the “Super Rain II” with a switching level accuracy of between 3 and 5 millimetres.
- d) If the rainwater tank is sufficiently full the system draws water from it for use in the garden, washing machine and W.C (if so plumbed). If the rainwater tank is empty, the system reintroduces the flow from the mains supply; but the amount of mains water used is only on a “as needed” basis.
- e) These systems included the “gap” between mains water and rainwater (as required by UK Building Regs.) as rainwater cannot flow back into the mains from the header tank.
- f) Most rain manager systems can also be switched over in manual mode, i.e. water feed can be mains water only, if required.
- g) The pump in a rain manager system is located within the integral housing of the system and is therefore both sucking rainwater from the underground water tank and pumping mains or rain water round the house. The pump’s presence in the house can be heard from close up, but such systems are usually equipped with a sound-muffling housing to reduce such noise.
- h) The pump in rain manager systems, being pressure sensitive, runs every time some water is drawn from toilets, washing machines or garden taps connected. The power surge on start-up, and the time the pump continues to run after water draw ceases, mean that these systems use a lot of electricity. This is one of several factors which was addressed by the Rain Director (see next page).

2) Rain Director mains backup and computer-controlled rainwater management system with smart header-tank

The Rain Director® ensures a constant head of clear rainwater under gravity for washing machines, toilets, the garden and other uses. A header tank in the home is controlled by electronic level sensors, valves and control panel (fitted on a wall on the ground floor).

The advantages over rainwater pumping systems like the Rain Manager are:

- a) The header tank only refills once it's completely empty so wear on the pump and electricity usage are both reduced (by a factor of 8).
- b) Provides a constant flow of rainwater under gravity at any time, including during power cuts.
- c) Mains water backup is automated by 12v electric level sensors.
- d) Rain Director®'s dashboard indicates present mode and allows special modes to be selected.
- e) Rain Director®'s auto-flush function detects when the occupant is away from home (for example, for holidays) and puts mains into the header instead of rainwater: no stained toilet bowls.
- f) Rain Director®'s set-up mode lets the control unit memorise the header tank size and flow rate of the mains and rain water inflow. This enables the time-out periods and operating water levels to be set.
- g) Rain Director® header tank has a built-in air gap as required by UK building regs.
- h) Price is similar to, or lower than, that of rain managers and other mini header-tank systems.
- i) Pump remains in the rain water tank so, there is no pump noise in the house.



The Rain Director® is built in the UK by ADL Products to the highest standards for, and under the control of, the leading provider of consumer rainwater harvesting products RainWaterHarvesting.co.uk.

All components have been designed to comply with WRAS (Water Regulations Advisory Scheme) and UK Building Regulations.

Order reference RWH-RD
www.RainDirector.co.uk
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