
0026114
AquaHarvest Domestic Direct RWH Systems
Installation Guidelines



Kingspan Environmental Service Contact Numbers:

IRE & GB: +44 (0) 333 240 6868

Enclosed Documents

AquaHarvest Domestic RWH Tanks	
DS1293P	GRW080 AquaHarvest Domestic Sales Drawing - 2350L
DS1294P	GRW110 AquaHarvest Domestic Sales Drawing - 3100L
DS1295P	GRW160 AquaHarvest Domestic Sales Drawing - 4600L

Direct System Schematic.	
DS1331P	AquaHarvest Domestic Direct Schematic - 2350L Tank



Issue	Description	Date
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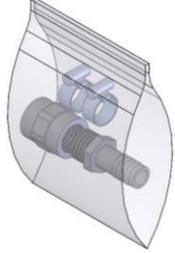
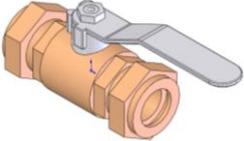
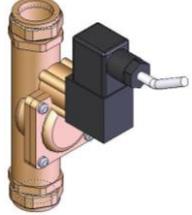
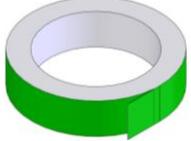
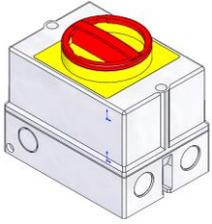
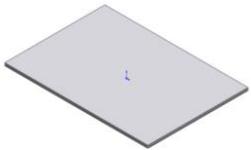
1 Introduction

- 1.1 These guidelines represent Best Practice for the installation of the above units. Many years of specialist experience has led to the successful installation of thousands of units it must be noted, however, that these Guidelines are necessarily of a general nature. It is the responsibility of others to verify that they are appropriate for the specific ground conditions and in-service loads of each installation. Similarly, a qualified specialist (e.g. Civil engineering consultant) must verify any information or advice given by our employees or agents regarding the design of an installation.
- 1.2 The unit is designed to be installed underground, as a minimum on a concrete slab with a concrete backfill.

2 Handling & Storage

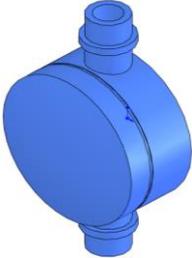
- 2.1 Care must be taken to ensure that units are not damaged during delivery and handling on site.
- 2.2 The design requirements of our products will frequently mean that the centre of gravity of the unit is “offset”. Care must therefore be taken to ensure that the unit is stable when lifting. Rainwater may also collect inside units, particularly if they have been stored on site prior to installation, adding weight and increasing instability. Check units before lifting and pump out any excess water.
- 2.3 When lifting units, use the lifting points provided on the tank casing with suitable straps & shackles of suitable specification.
- 2.4 A suitable spreader bar should be used to ensure that units are stable and that loads are evenly distributed during lifting. When lifting units, a spreader bar should be used where the slings would otherwise be at an angle > 30 degrees to the vertical.
- 2.5 Lifting equipment should be selected by taking into account the unit weight, length and the distance of lift required on site.
- 2.6 We accept no responsibility for the selection of lifting equipment.
- 2.7 Whenever our units are stored or moved on site, ensure that the storage location is free of rock, debris and any sharp objects, which may damage the unit. The units must be placed on ground, which is flat and level to evenly support the base of the unit. Do not roll units.

3 Site Delivery Checklist.

Item 1	<p>1 x Storage Tank</p> 	Item 2	<p>1 x PUMP (1011579)</p> 	Item 3	<p>1 x Kit (AQBBAG)</p> 
Item 4	<p>1 x Valve (011545)</p> 	Item 5	<p>1 x Inline Filter (004934)</p> 	Item 6	<p>1 x Float (015364)</p> 
Item 7	<p>1 x Tundish (004937)</p> 	Item 8	<p>1 x Solenoid (004929)</p> 	Item 9	<p>1 x MDPE Conn (000947)</p> 
Item 10	<p>1 x Label Reel (004932)</p> 	Item 11	<p>1 x Pump Panel (026138)</p> 	Item 12	<p>1 x Pump Isolator (010052)</p> 
Item 13	<p>1 x Manual (026114)</p> 	Item 14	Item 15	Item 15	Item 15

All above items (except the tank) will be supplied in a box with the tank, if there are any shortages please contact our warranty department straight away.

4 Additional Components Required (Not Supplied As Standard).

Item 1	1 x Pressure Vessel		<p>BS Approved Pressure Vessel. (A Minimum 10L Pressure Vessel Will Cover 95% Of Domestic Direct Systems, These Are Essential To The Operation Of the Sytsem But Not Supplied By Kingspan).</p>
Item 2	1 x Flow Meter		<p>Flow Meter. (Will Tell You How Much Rain Water The System Has Used. This Is Not Vital To The System Operation).</p>
Item 3	Rigid Pipe & Fittings		<p>Supplied By Others.</p>

NB: The Pressure Vessel, Rigid Pipe and Fixings are required to complete the installation. The Flow Meter can be fitted to enable you to monitor the amount of Rainwater used but is not essential to the system function.

5 Tank Installation – (Civil Work)

5.1 Siting

- 5.1.1 Where possible, take advantage of any gradient across a site to minimise the invert depth at the tank inlet, as this will reduce excavation. For frost protection a minimum invert depth of 500mm is recommended.
- 5.1.2 Avoid siting tanks in ground with a large gradient directly around the proposed position, as this can cause excessive ground pressure on the tank.
- 5.1.3 Our tanks are not designed to accept any traffic loads. A minimum traffic clearance of 2 metres must be provided. If this is not possible the tank must be protected from superimposed loads, e.g. by a reinforced concrete surround and provided with an appropriate cover, which must not bear on the structure of the tank. Please contact a consultant civil engineer.

5.2 Before Installing Your Tank

- 5.2.1 Ensure Building Regulation approval.
- 5.2.2 Ensure ground porosity is suitable.
- 5.2.3 Inspect tank for damage before installation. Our tanks have been fully tested before despatch from our factory. Once the tank has been installed, we cannot accept claims for damage.
- 5.2.4 Check that you have the correct invert drain depth (neck height) of tank.
- 5.2.5 Check orientation and heights of inlet and outlets.
- 5.2.6 The tanks are supplied with a standard invert of 720mm – the invert can be reduced in 100mm increments to a minimum 320mm if required – Refer to drawing DS1298P
- 5.2.7 DO:-**
- 5.2.8 Use the correct backfill material.
- 5.2.9 Consider drainage falls, generally 1 in 60/70 between house and tank and maximum 1 in 200 for soakaways or other irrigation systems.
- 5.2.10 Lift the tank using ropes or slings through both of the shackles fitted either side of the neck.
- 5.2.11 DO NOT:-**
- 5.2.12 Subject the tank to impact or contact with sharp edges.
- 5.2.13 Exceed an invert depth of 720mm
- 5.2.14 Install in trafficked areas without a suitable backfill design.
- 5.2.15 Site the tank so that it is subjected to excess ground pressure (e.g. sloping sites) or applied loads such as may be generated by the proximity of vehicular traffic.
- 5.2.16 Lift using only one lifting point.
- 5.2.17 Fill an unsupported tank.

5.3 Installation – General

- 5.3.1 When units are installed in unstable ground conditions where movement of the surrounding material and/or unit may occur, the connecting pipework should be designed to minimise the risk of damage from differential movement of the unit(s) and/or surrounding material.
- 5.3.2 For units with burial depths greater than 720mm Inlet Invert, specific site conditions should be taken into consideration and the backfill designed to bear any loads which may be applied during and after installation to prevent the tank being subjected to these loads.
- 5.3.3 The excavation must be deep enough to provide bedding and cover depth as determined by the type of surface pavement and loading. Asphalt and concrete pads should extend a minimum of 300mm horizontally beyond the unit in all directions.
- 5.3.4 In situations where the excavation will not maintain a vertical wall, it will be necessary to shore up the side walls of the excavation with suitable trench sheets and bracing systems to maintain a vertical wall from the bottom to the top of the excavation. DO NOT completely remove the shoring system until the backfilling is complete. These sites should be considered as wet sites.
- 5.3.5 In areas where the water table is above the bottom of the excavation and/or the excavation is liable to flood, the excavation should be dewatered using suitable pumping equipment and this should continue until the installation is complete.
- 5.3.6 During installation care must be taken to ensure that the body of any unit is uniformly supported so that point loads through the unit are avoided.
- 5.3.7 The Concrete Specification is a general specification. It is not a site specific installation design.

GENERAL CONCRETE SPECIFICATION IN ACCORDANCE WITH BS EN 206-1 (BS 8500-1)	
TYPE OF MIX	(DC) DESIGN
PERMITTED TYPE OF CEMENT	BS 12 (OPC): BS 12 (RHPC): BS 4027 (SRPC)
PERMITTED TYPE OF AGGREGATE (coarse & fine)	BS 882
NOMINAL MAXIMUM SIZE OF AGGREGATE	20 mm
GRADES: C25 /30 C25 /30 C16 /20	REINFORCED & ABOVE GROUND WITH HOLDING DOWN BOLTS REINFORCED (EG. FOR HIGH WATER TABLE) UNREINFORCED (NORMAL CONDITIONS)
MINIMUM CEMENT CONTENT	C30 C20 270 - 280 Kg/M ³ 220 - 230 Kg/M ³
SLUMP CLASS	S1 (25mm)
RATE OF SAMPLING	READY MIX CONCRETE SHOULD BE SUPPLIED COMPLETE WITH APPROPRIATE DELIVERY TICKET IN ACCORDANCE WITH BS EN 12350-1
NOTE: STANDARD MIXES SHOULD NOT BE USED WHERE SULPHATES OR OTHER AGGRESSIVE CHEMICALS EXIST IN GROUND WATER	

5.4 Tank Installation.

5.4.1 Dry Ground Conditions.

5.4.2 These tanks can be installed with pea shingle backfill strictly where the site is always considered a Dry Site, however based on the current climate and the nature of these systems (Rainwater Harvesting Tanks) these occasions will be very rare. If there is any doubt the units should be installed with Concrete backfill.

Tanks installed incorrectly (i.e. with Pea Shingle on a wet site) can cause major site issues, cases of a) tanks collapsing or b) tanks coming out of the ground due to water table pressures are not uncommon.

- 5.4.3 Excavate the site, allowing for a minimum clearance on all sides and base of the unit of 200mm and level the base.
- 5.4.4 Ensure that the hole is kept dry. Should any rain or surface water collect in the hole, this should be pumped out.
- 5.4.5 A base of at least 200mm of lean mix concrete should be provided.
- 5.4.6 Lower the tank in the hole using a rope sling through the lifting points provided on the tank. Under no circumstances should the sling be attached to the inlet pipe or the overflow pipe.
- 5.4.7 Position the inlet pipe in line with the incoming drain. The unique profile of the base will help to level the tank, but make sure the tank is in the truly upright and level before proceeding with installation.
- 5.4.8 After any concrete in the base has taken up its initial set (usually after one day), ballast the tank by putting approximately 0.5m depth of water into it.
- 5.4.9 Backfill the space around the tank with pea gravel or similar material. The backfill should be free from organic material, large stones, bricks or sharp objects. Backfilling should be carried out in layers, making sure that voids are not left under and around the sides of the tank and that there are no localized stress concentrations. It is most important that the installer progressively fills the tank with water to the level above the backfill in order to stabilize pressures on the tank.
- 5.4.10 Remove any temporary covers and connect up the Ø110mm tank inlet, 25mm MDPE Pump outlet, 25mm MDPE mains top up, overflow and cable duct pipes to your own pipework. Do not use reducers. Ensure pump outlet and mains to p up are watertight before backfilling.
- 5.4.11 Connect up the vent pipe and run pipework to above ground stacked outlet, this must also act as vermin protection to the storage tank
- 5.4.12 Backfilling can now proceed up to ground level in 200mm stages ensuring tank is ballasted in all chambers as you go.
- 5.4.13** The tank is supplied with a pedestrian rated lockable manhole cover. **THE TANK MUST NOT BE LOAD BEARING.**

5.4.14 Wet Ground Conditions:

- 5.4.15 Excavate a hole to appropriate depth allowing at least 300mm for lean mix concrete and hard-core base. Allow for tank width plus at least 400mm with additional allowance for any necessary shuttering.
- 5.4.16 De-water the excavation using suitable pumping equipment. Ensure that the pump discharge does not saturate the ground in the immediate vicinity. In wet ground conditions the installer should ensure that the base is adequate to support the weight of the tank and its contents. If the base of the excavation is unstable, i.e. running sand or similar, excavate an additional 250 – 300 mm below concrete levels and fill up with compacted hard-core. Place a sheet of polythene over the hard-core and up the sides of the excavation before putting in the concrete cradle.
- 5.4.17 Lay a bed of concrete (minimum 150mm thick) on top of the polythene at the base of the excavation. De-watering is to continue until you are satisfied that the concrete has cured.

- 5.4.18 Lower the tank onto the concrete bed, ensuring that the inlet and overflow are in the correct position. Ensure the tank is upright and then ballast it with water to a maximum of 300mm deep.
- 5.4.19 Haunch up the concrete bed at least 450mm all round the base, ensuring that all voids in the concrete are eliminated and at least 150mm of concrete is left below the tank base.
- 5.4.20 Backfill to the invert depth with concrete. Ensure that the water level inside the tank is maintained no more than 200mm above concrete backfill level. It is most important that the installer progressively fills the tank with water to a level above the backfill in order to stabilise pressure on the tank.
- 5.4.21 Backfill evenly all round the tank, consolidating in layers. The backfilling should start before the base has hardened and be a single continuous operation so that the tank has a full concrete jacket without joins.
- 5.4.22 DO NOT use vibrating rammers to consolidate concrete. DO NOT discharge concrete directly on to tank. Ensure that the concrete is not too wet and that is tamped in around the tank.
- 5.4.23 Remove any temporary covers and connect up the Ø110mm tank inlet, 25mm MDPE Pump outlet, 25mm MDPE mains top up, overflow and cable duct pipes to your own pipework. Do not use reducers. Ensure pump outlet and mains top up are watertight before backfilling.
- 5.4.24 Connect up the vent pipe and run pipework to above ground stacked outlet, this must also act as vermin protection to the storage tank
- 5.4.25 Build up a shell of concrete around the neck of the tank to 150-200mm thickness before completing the backfill with a suitable material. Care must be taken to avoid distortion of the neck whilst concreting this area.
- 5.4.26 The tank is supplied with a pedestrian rated lockable manhole cover. THE TANK MUST NOT BE LOAD BEARING
- 5.4.27 Do not empty tank until the concrete backfill has cured. Tanks may be left filled with water.

6 System Installation – (Plumbing & Electrical)

This section will be explaining how to install the components supplied in the box with the tank Please refer to 026121 Instruction sheet throughout out the installation of these parts. This gives you a check list to ensure you have all components and also pictorial installation details.

In the Rainwater Storage Tank:

- 6.1.1 The following is assuming the tank is installed and all relevant pipe connections are made.
- 6.1.2 Ensure you have all components required to carry out the installation, please contact us immediately if you are missing any items.
- 6.1.3 The items on the 'Site Delivery Checklist' on page 3 of this manual, are referred to as we go through the process
- 6.1.4 Connect the 3m of ¾" Hose (Item 6 – Pre-fitted in the neck) to the outlet connection of the Pump (Item 2), using fittings and Jubilee Clip (Item 3) provided.
- 6.1.5 Lower pump assembly into the small pump chamber in the tank by the rope (not the cable) securing the rope to the eyelet in the neck of the tank, ensuring the pump rests in an upright position in the small pump chamber inside the tank.
- 6.1.6 Run the pump cable through the Cable Duct and wire to a fused spur at mains point. NB there is 15m of cable supplied with the pump, if a longer cable is required the installer must use an IP65 junction box and supply an additional length of cable to run to the fused spur.
- 6.1.7 Run the float cable through the cable duct to the Solenoid Valve (Item 8) which controls the mains water switching inside the property and connect (this controls the mains top up feed to the tank in times of no rainfall).

In the Property:

- 6.1.8 Connect the 25mm MDPE Connection (Item 9) to the MDPE pipe (supplied by others) supplying rainwater from the tank to the property.
- 6.1.9 Then connect the In-Line Filter (125 micron) (Item 5) to the opposite end of the 25mm MDPE connection.
- 6.1.10 Run a length of 22mm rigid pipe (supplied by others) from the free end of the In-Line Filter and connect to the Shut off valve with appropriate fitting and MDPE tape. The shut off valve enables the system to be shut off if there is ever a requirement.
- 6.1.11 Run a length of 22mm from the Shut Off Valve to the Flow Meter (NB: the Flow Meter is an optional extra it is NOT supplied as standard, the system does not need this to work it is just an indicator of how much rainwater has been used).
- 6.1.12 Run internal rigid 22mm pipework from the in-line filter (or flow meter if fitted) and connect to an appropriate pressure vessel (NB: a pressure vessel is not supplied as standard but we can offer as an optional extra! A 12L pressure vessel will be suitable for MOST domestic Direct applications, but please check with a qualified plumber for your specific site).
- 6.1.13 Run rigid 22mm pipework (supplied by others) from the outlet of the pressure vessel to necessary appliances around the property.
- 6.1.14 This completes the installation of the system from the tank to the appliances.
- 6.1.15 Connect the Solenoid (Item 8) to the end of the mains pipe (which supplies mains water to the tank in times of no rain fall) and connect the opposite end to the top of the Tundish (Item7), connect the bottom of the Tundish to the pipe running from the tank.

Refer to Drawing DS1333P (AquaHarvest Domestic RWH Direct Wiring Diagram) for electrical connections to the Pump Isolator (Supplied), Rainwater Pump Status Panel (Supplied) and Fused Spur (Supplied by Others).
- 6.1.16 Turn on the power to the system and use one of the connected appliances (flush a toilet etc), ensure the pump starts and supplies the appliance with rainwater. Once demand for rainwater has ceased ensure pump stops. If pump does not stop check for leaks in the system or that the correct pressure vessel has been installed.

7 Warranty

Taken from 'Kingspan's Terms & Conditions of Sale'

The company will replace or, at its option, properly repair without charge any goods which are found to be defective and which cause failure in normal circumstances of use within a period of twelve months from the date of delivery.

This warranty is conditional upon:

- (a) The Buyer notifying the Company of any claim within Seven days of the failure becoming discernible.
- (b) The Company being allowed a reasonable opportunity to inspect the goods so as to confirm that they are defective.
- (c) the goods not having been modified, mishandled or misused and being used strictly in accordance with any relevant instructions issued by the Company.

The Company's liability under this Clause is limited to the repair or replacement of the defective goods, and does not cover costs of transport, installation or associated site costs, if applicable.

The Company's liability to replace or repair the goods is in lieu of and excludes all other warranties and conditions, and in particular (but without limitation) the Company shall have no liability of any kind for consequential loss or damage.

For any further advice, please contact us.

A Warranty Form is included in this package, to register your unit for Warranty. Please complete ALL sections of the Form, and return it at your earliest convenience.

Our service provider: Kingspan Environmental Services: 0844 225 2785

HEALTH & SAFETY

THESE WARNINGS ARE PROVIDED IN THE INTEREST OF SAFETY. YOU MUST READ THEM CAREFULLY BEFORE INSTALLING OR USING THE EQUIPMENT.

These Guidelines represent Best Practice for the installation of our spherical tanks. Many years of specialist experience has led to the successful installation of thousands of units. It must be noted, however, that these Guidelines are necessarily of a general nature. It is the responsibility of others to verify that they are appropriate for the specific ground conditions and in-service loads of each installation. Similarly, a qualified specialist (e.g. civil engineering consultant or certified installer) must verify any information or advice given by employees or agents of Kingspan regarding the design of an installation. It is important that this document is retained with the equipment for future reference. Should the equipment be transferred to a new owner, always ensure that all relevant documents are supplied in order that the new owner can be acquainted with the functioning of the equipment and the relevant warnings.

INSTALLATION SHOULD ONLY BE CARRIED OUT BY A SUITABLY EXPERIENCED CONTRACTOR, FOLLOWING THESE GUIDELINES. ELECTRICAL WORK SHOULD BE CARRIED OUT BY A QUALIFIED ELECTRICIAN.

When covers are removed precautions must be taken against personnel falling into the unit. Should you wish to inspect the operation of the equipment, please observe all necessary precautions, including those listed below, which apply to maintenance procedures. Ensure that you are familiar with the safe working areas and accesses & that the working area is adequately lit. Take care to maintain correct posture, particularly when lifting. Use appropriate lifting equipment when necessary. Keep proper footing and balance at all times. Avoid any sharp edges. The removal of sediment should be carried out by a contractor holding the relevant permits to transport and dispose of such waste. The contractor must refer to the guidelines in this document.

AS WITH ALL SITE WORK, THE DANGERS OF WORKING WITH WATER AND ELECTRICITY POSE SEVERE THREATS TO HEALTH, IF OBVIOUS AND FUNDAMENTAL PRECAUTIONS ARE NOT TAKEN. THEREFORE IF YOU ARE IN ANY DOUBT REGARDING ANY OF THE FOLLOWING, PLEASE DO NOT HESITATE TO CONTACT US.