TUFLOCK® DIY THERMAL SOLAR POOL HEATING KITS

INSTALLATION MANUAL

AUSTRALIAN MADE SOLAR POOL HEATING

AVAILABLE THROUGH:

NCS POOL HEATING SYSTEMS

MANUFACTURED BY:

BOSS™ SOLAR

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INTRODUCTION

PURPOSE AND SCOPE

The intent of this installation guide is to equip the reader with sufficient knowledge to design and install a TufLock DIY thermal solar pool heating system. To ensure that the Systems and Components function and perform correctly, all recommendations presented in this manual should be adopted by the reader; failure to do so may void the warranty. This installation guide is for domestic installations only.

SAFETY PRECAUTIONS

When installing a solar system, always exercise extreme caution when working with heights or around water; do not use short cuts, as there is no substitute for safety. The must accept responsibility for assessing and implementing safety systems and procedures in accordance with all regulatory and moral requirements. The potential to fall from a roof is a major risk along with electric shock and exposure to harmful U.V. radiation and heat exhaustion.

It is expected that the reader installing the system uses all necessary safety harnessing, scaffolding, safety railing and suitable footwear. It is also expected that the reader is aware of any electrical shock hazards, weather conditions, the roof condition, roof access methods, pitch angle, and sun protection when deciding to install the system.

For more information on working safely with heights, check out the Work Safe 'Working with Heights' website for more information

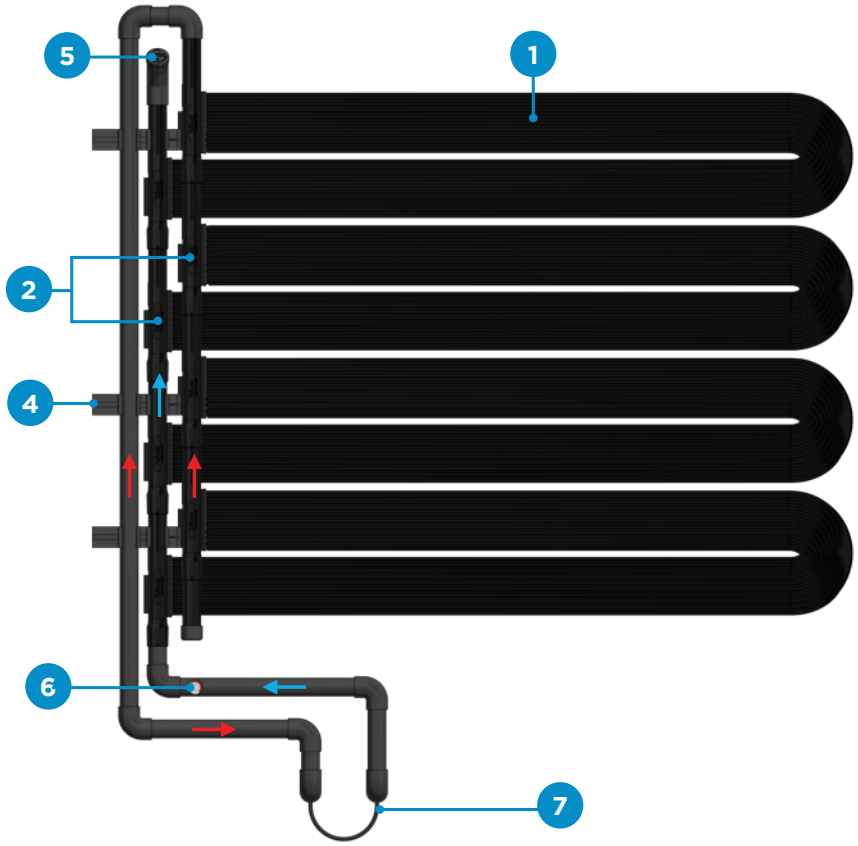
http://www.worksafe.vic.gov.au/safety-and-prevention/small-business/12-ways-to-make-small-businesses-safer/working-at-heights

BEFORE YOU START LOCATION ADVICE

It's important you select a suitable roof to ensure optimum performance of your new thermal solar system. Take care to select a roof with no shading from neighbouring buildings or vegetation.

The optimum position to install a thermal solar pool heating system is on a Northwest, North, flat (15° or less), or West facing roof. A system can be installed on an East facing roof, however a slight increase in on coverage is recommended. Approximately 6%. It is not recommended to install a solar system on a South facing roof.

HOW IT WORKS



1. TufLock Solar Coils
2. TufLock Manifold
3. Barb Lock
4. TufLock Manifold Mount
5. VacRel Vacuum Relief Valve VHP
6. TufGauge In-line Solar Pressure Gauge
7. Drain Down / Equaliser Kit

Thermal Solar Pool Heating is a simple and effective form of pool heating. Pool water is pumped through a series of tubes, known as a solar collector which is installed on your home, shed or other nearby building. The solar collector absorbs the sun's free heat and transfers it to the pool water that is being pumped through it. This heated water is then returned back to the pool.

You can automate the heating process by installing a digital solar controller, which monitors the roof and pool temperatures and automatically switches the system on and off to ensure maximum heating efficiency.

REQUIRED TOOLS

STANDARD CAULKING GUN

TYPE 'P' PVC CEMENT & PRIMER

IMPACT DRIVER OR DRILL

PHILIPS HEAD BIT

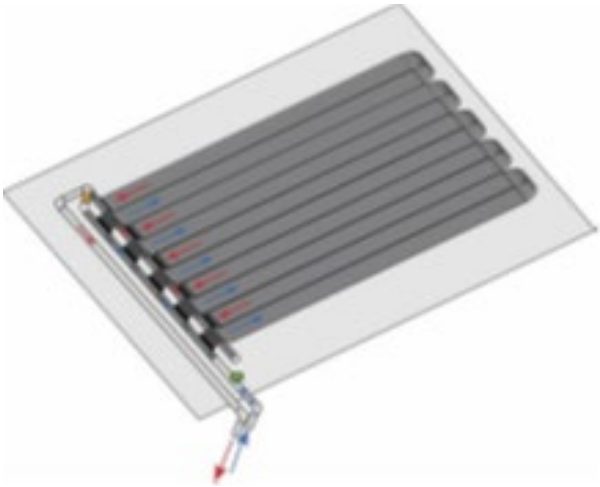
8.5MM DRILL BIT

INSTALLING THE SYSTEM

SYSTEM CONFIGURATION

Review the below solar configurations and select the system that will best suit your roof shape.

All systems must be plumbed with a feed header, return header and a balance pipe to ensure complete and even water flow throughout the collector.



Bottom Feed System - "U" Loop Configuration

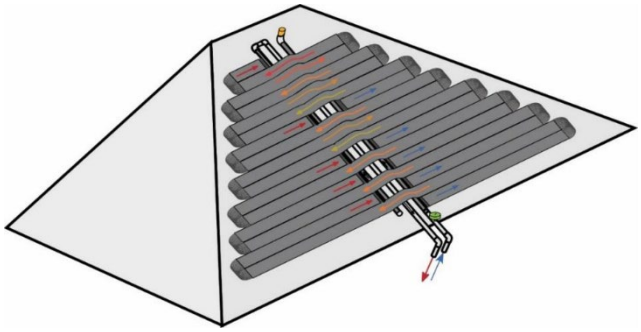
Bottom Feed Loop Return

This plumbing configuration provides:

- Even water flow throughout the collector when the pump is switched on, and
- Swift and efficient drain down back to the pool when the pump is switched off
- Configuration can be installed over multiple roof faces

Depending on the roof shape and size, the installer has the choice to install the Bottom Feed Solar System in several different configurations:

This configuration should be adopted wherever possible.



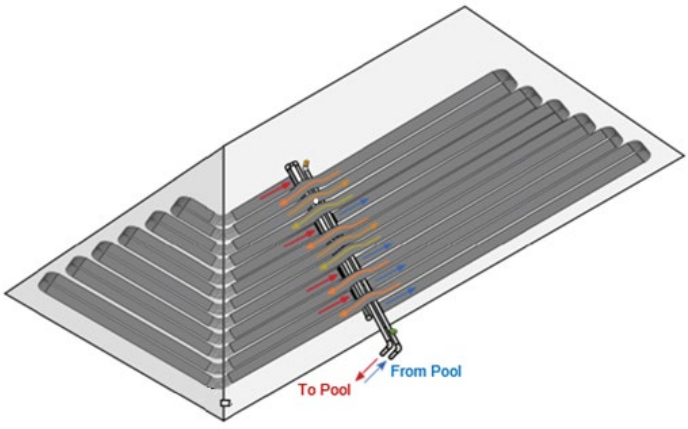
Bottom Feed System - Butterfly Configuration

Bottom Feed Butterfly

This plumbing configuration provides:

- Swift and efficient drain down back to the pool when the pump is switched off
- Efficient use of available roof space on triangular or odd shaped roofs
- Configuration can be installed over multiple roof faces

Note: Configurations with varying loop run lengths may result in reduced system efficiency and performance



Bottom Feed System - Butterfly Configuration Multiple Roof Surfaces

INSTALLING THE SYSTEM

MANIFOLD INSTALLATION

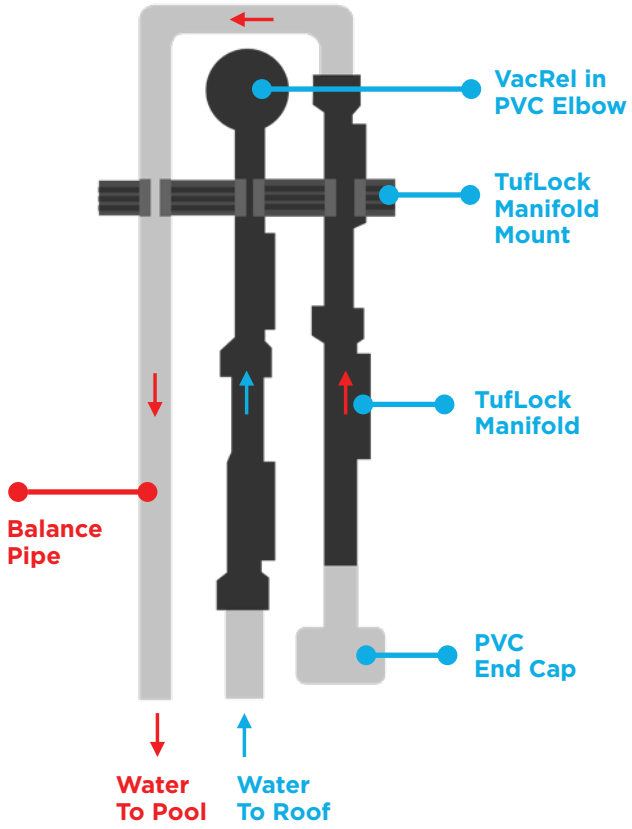
Step 1

Taking note of which pipe is flow and return, complete the PVC pipework from the gutter up, utilising 40mm PVC pressure pipe.

The FLOW pipe (Water to Roof) will require a 45° elbow and Vacrel installed at the very top of the system.

The RETURN pipe (Water to Pool) requires two 90° elbows and one end cap at the very bottom of the system.

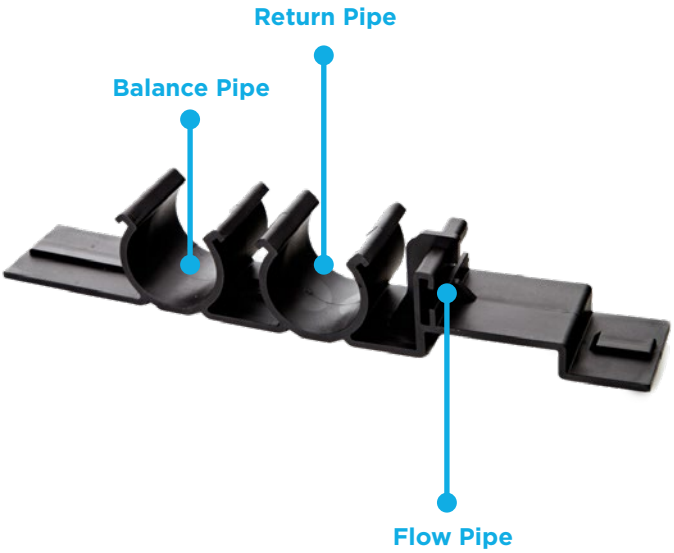
Secure all manifolds, PVC pipes and components using type 'P' PVC cement, primer and standard cementing procedures.



Step 2

Secure all three pipes (flow, return and balance pipe) using the TufLock Manifold Mount. Start by positioning the supplied mounts evenly down the roof.

Once satisfied, apply a bead of ProSil Silicone under either end of the Mount. Secure to the roof using two screws.



SOLAR COLLECTOR COIL INSTALLATION

Step 1

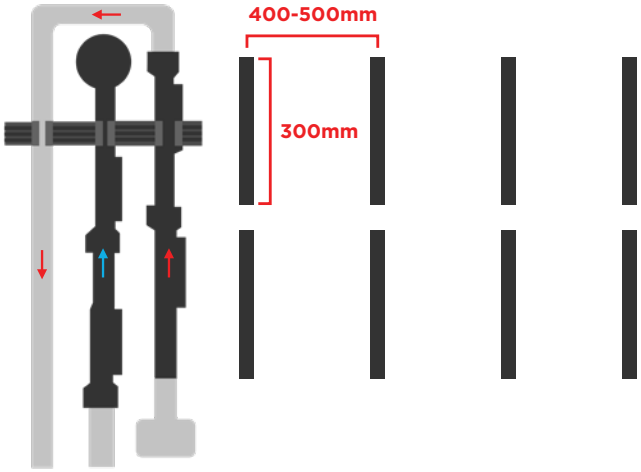
Beginning at the top of the installed pipework, insert the barbs of the TufLock Solar Coils into the ports of the highest **RETURN** TufLock Manifold (outermost manifold) *.

Ensure that the barbs are fully engaged before inserting the Barb Lock into the moulded slots of the manifold. The raised lip of the Barb Lock should be facing towards the collector. Push down firmly in the centre and then the outsides until you hear a click.

Do not fold the coil over and push on the back of the barbs, as this may damage the tubing

Step 2

To secure the TufLock Collector to the roof, you will need to apply several lines of Prosil 60 Black Silicone. Each line of silicone should be approximately 300mm long and spaced every 400-500mm apart. Stop approximately 200mm from the end of the desired system width.



Do not use any adhesive other than the Prosil product provided - untested silicones can have negative effects on the solar collector

Step 3

Unroll the coil in a straight line over the ProSil Silicone and gently press down. Stop once you reach the designated length, gently lead the coil around (do not flip) and fold the looped section of the coil in half (onto itself). Apply a bead of silicone underneath.

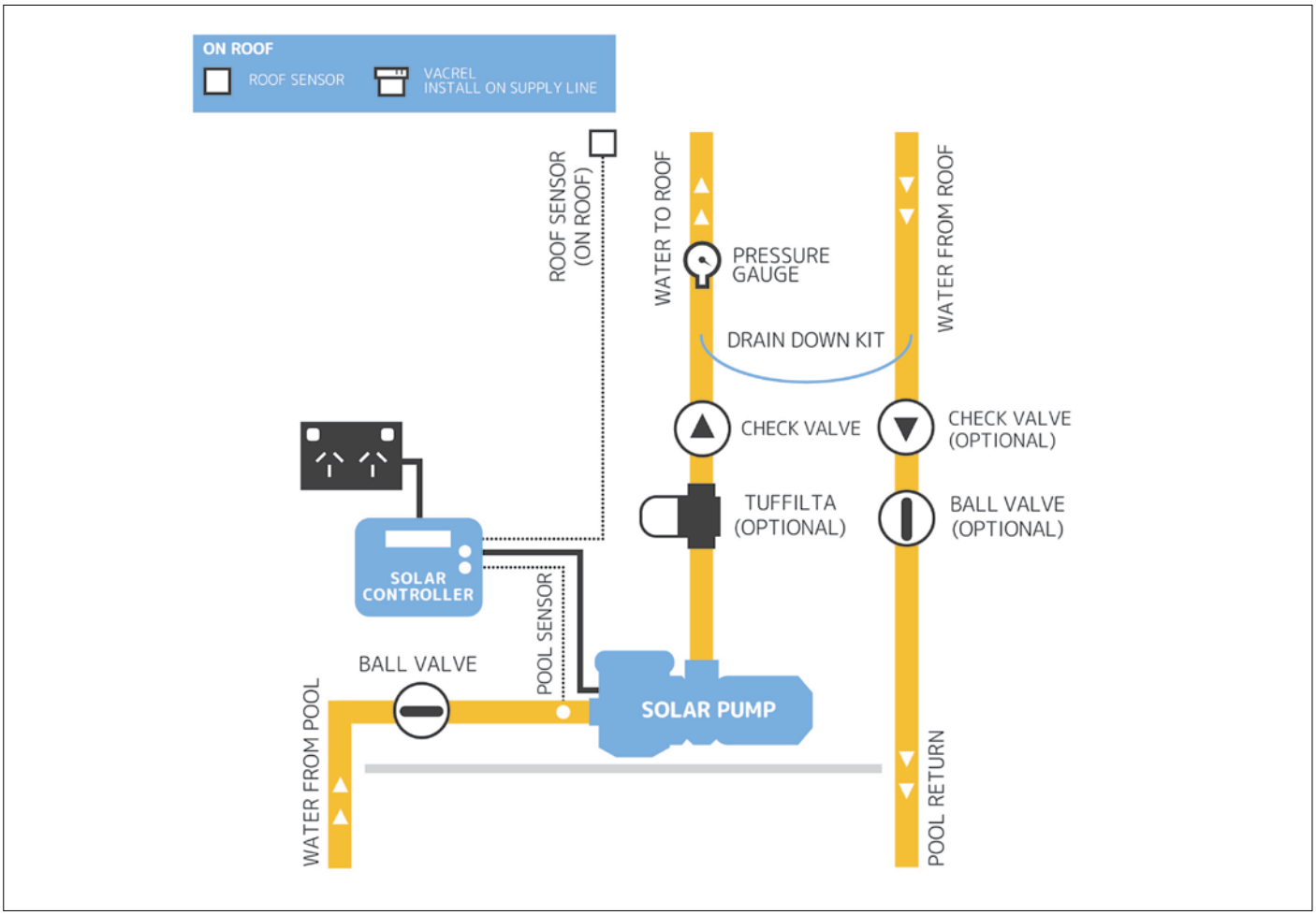
Continue unrolling the Solar Coil back towards the manifold system. Connect the other end of the solar coil into the ports of the highest **SUPPLY** TufLock Manifold (central manifold). Insert the Barb Lock to secure the components.

Repeat until all TufLock Solar Coils have been installed.

PLUMB THE SYSTEM TO THE PUMP HOUSE

INDEPENDENT / SEPARATE SUCTION SYSTEM

The pool water is pumped directly from the pool to the solar collector and then back. This configuration requires solar provisions to have been pre-installed. It is simple to install and does not interrupt the filtration system. This type of plumbing allows the Solar System to operate independent of the filtration system.



REQUIRES

- 1 x AS2, AS2_2S Digital Solar Controller or similar
- 1 x Check Valve (also known as a Non-Return or One-Way Valve)
- 1 x Solar Pump (that can deliver 3-4 litres per minute per m² of collector)

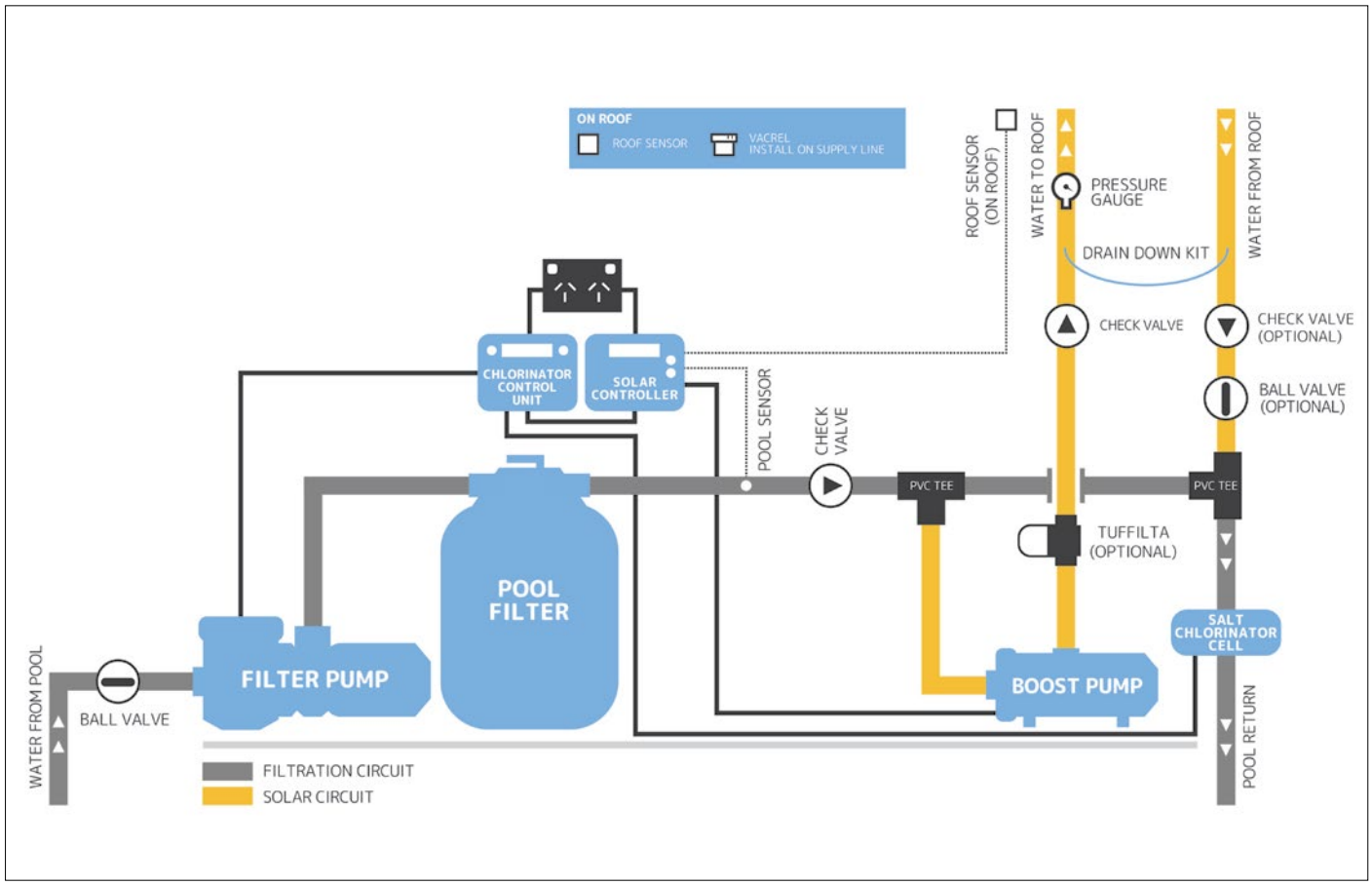
TO INSTALL

Identify and confirm the solar Supply and Return lines, even if they are labelled. This can be achieved by removing the caps (if there are any) and yelling down the pipes or by pouring water down the line. The Suction line should join at the swimming pool to two suction points, typically deep on the wall of the pool. The Return line is typically a single return outlet, usually higher on the pool wall than the suction lines. Plumb as per the diagram above. Ensure all pipework is dry and clean before attempting to glue.

PLUMB THE SYSTEM TO THE PUMP HOUSE

SIMULTANEOUS / INTEGRATED / RETRO FIT CONFIGURATION

This system involves diverting the flow of water after the filtration system. This system is usually adopted when independent solar suction and return lines do not exist, as it is an easy way to retro fit a solar system without affecting any other part of the pools structure.



REQUIRES

- 1 x AS2_2S Digital Solar Controller or similar
- 1 x Check Valve (also known as a Non-Return or One-Way Valve)
- 2 x PVC Tees
- 1 x Booster Pump (that can deliver 3 litres per minute per m² of collector)

TO INSTALL

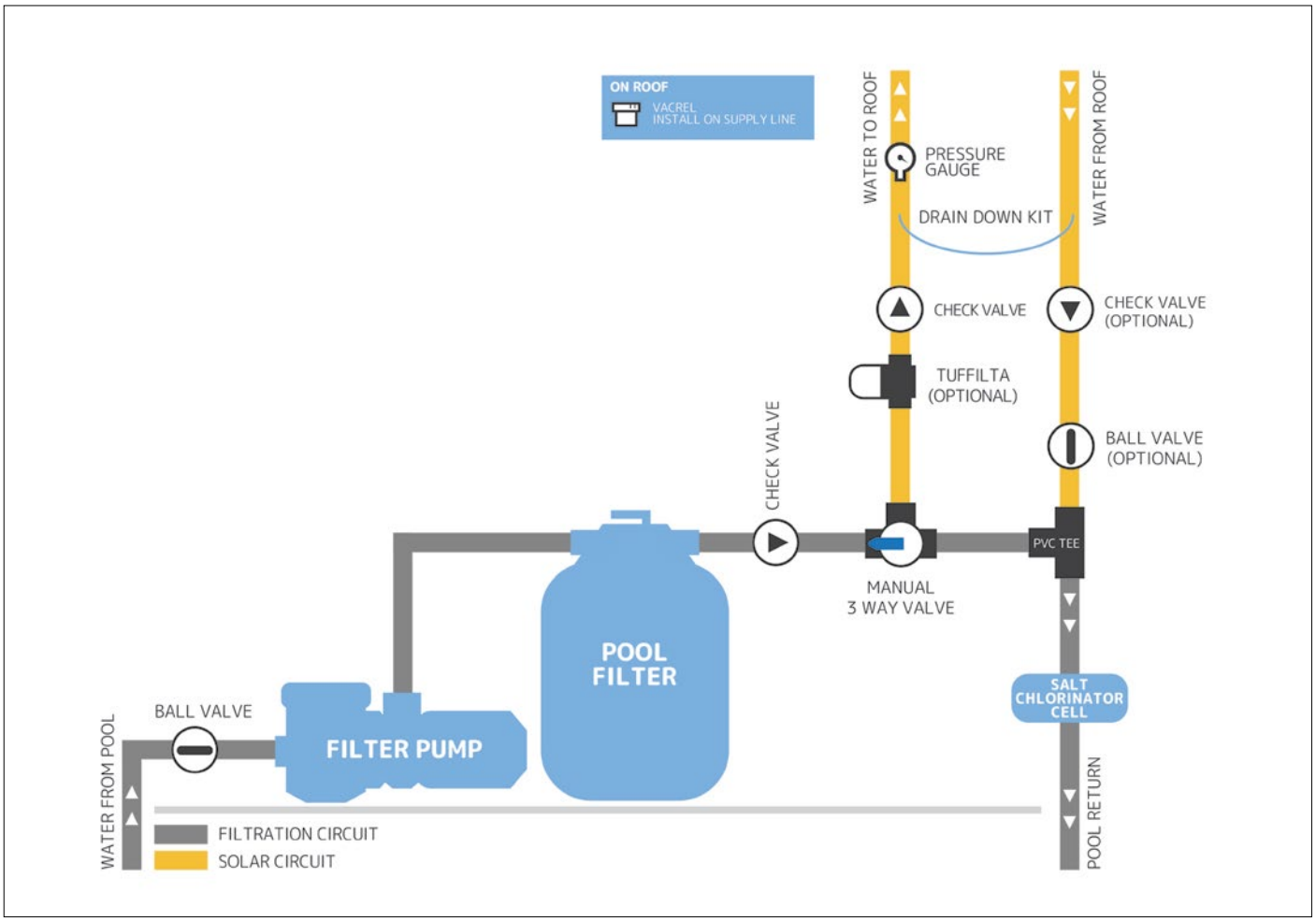
Identify and confirm the Pool Return line that is running from the Pool Filter This can be determined by identifying the return line on a filters multi-port valve when using a media filter or when using a cartridge filter identifying the return port.

Switch the system off and isolate any valve/s (if possible) to minimise water loss. Identify the best position to cut into the line to install the two PVC Tees, Check Valve and Pump. Plumb as per the diagram above. Ensure all pipework is dry and clean before attempting to glue.

PLUMB THE SYSTEM TO THE PUMP HOUSE

MANUAL SYSTEM (NO PUMP OR DIGITAL CONTROLLER)

Involves plumbing into the filtration line and manually opening and closing a three-way valve to divert water to the system. This system does not require a Digital Controller or Solar Pump and is the cheapest way to plump the system. However, you have very limited control over the heating process and must remember to go out and adjust the valve if you want the system to operate. Before proceeding with this type of installation you should determine the capacity of your existing pool pump. The plumbing must be cut in before any other pool equipment (e.g., chlorinator cell, heat pump, gas heater etc.).



REQUIRES

- 1 x Check Valve (also known as a Non-Return or One-Way Valve)
- 1 x PVC Tee
- 1 x 3-Way Manual Valve

TO INSTALL

Identify and confirm the Pool Return line that is running from the Pool Filter Switch the system off and isolate any valve/s (if possible) to minimise water loss. Identify the best position to cut into the line to install the three-Way Manual Valve, PVC Tee and Check Valve. Plumb as per the diagram above. Ensure all pipework is dry and clean before attempting to glue.

INSTALL THE ANCILLERY COMPONENTS

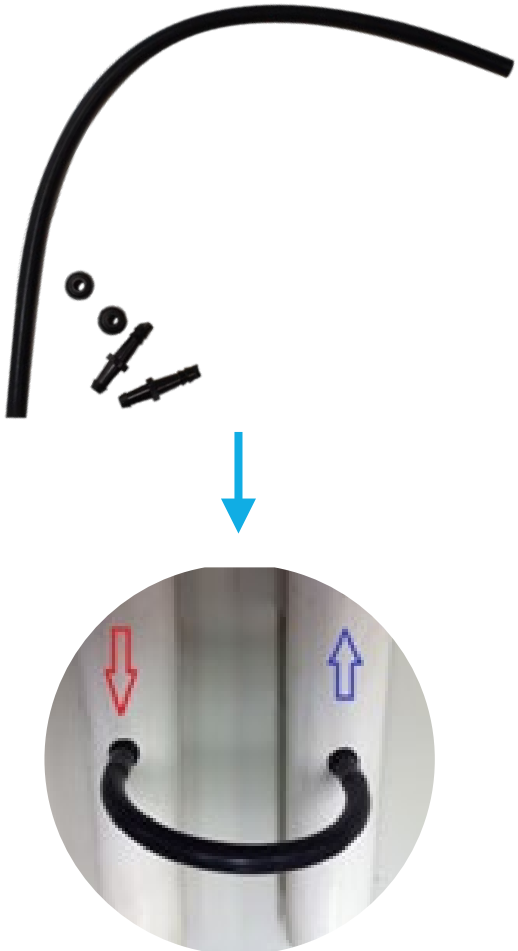
VACREL VACUUM RELIEF VALVE

The VacRel should be installed at the highest point of the FLOW (cold) line in a 40mm 45° or 90° elbow.

Glue a the VacRel into the PVC elbow using standard plumbing techniques, making sure the upper socket of the VacRel is as vertical as possible

Clean any excess glue so that the top cap can still be removed in future for maintenance

DRAIN DOWN TUBE



The Drain Tube allows the supply pipe to slowly drain back via the return pipe when the pump is switched off.

To install, mark a location on both the supply and return pipework, approximately 1 – 1.5m above the pump level against the wall. Drill 8.5mm holes in the pipes, using an 8.5mm Drill Bit.

It is highly recommended that you drill a small pilot hole first, then drill the holes by running the drill in reverse to minimise the risk of pipe shatter. Using a blunted drill bit is also preferable. Clean the drill swarf and burrs.

Lubricate the and insert the rubber grommets into the drilled holes, tapered end first. Spray the newly installed grommets with silicone spray and insert the header barbs, lubricate and slide the tube over each barb.

INSTALL THE ANCILLERY COMPONENTS

TUFGAUGE PRESSURE GAUGE

To Install, drill an 8.5 mm hole in the PVC supply pipe and clean the hole of any debris. Insert the tapered end of the rubber grommet into the hole.

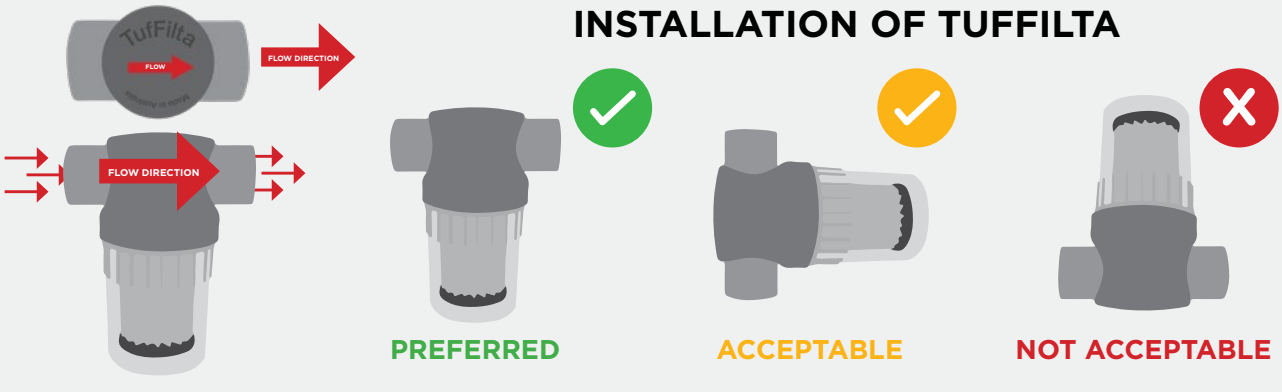
Lubricate the brass barb and insert it into the rubber grommet, ensuring full engagement. Ensure the pressure is between 1 and 100 kPa / 15 psi (top fed systems 50 kPa / 7 psi max.).

TUFFILTA INLINE SOLAR FILTER

Determine the best location to install the TufFilta®. This should be on the FLOW (cold) line of the solar pool heating system, directly after the solar/booster pump on the discharge side. For manual systems (no pump or digital controller), install the TufFilta® after the manual 3-way valve.

Install the TufFilta® using type N cement and primer. Ensure that you install the TufFilta® with the 'FLOW' arrow pointing in the correct direction. Do not install the TufFilta® upside down.

Install an isolating valve (check valve) on the discharge side of the TufFilta®. This enables the cartridge element to be removed and replaced without drenching equipment or the person performing the task.



STARTING THE SYSTEM

Before switching the system on, please allow 24 hours for all adhesives to set. Ensure the Pump is primed before switching it on (or open the valve on a manual system).

You will notice some air bubbles in the pool return outlets - this is normal and will clear after several minutes. It will occur each time the system starts.

Survey the entire system, ensuring you check:

- The fittings and fixtures are primed and cemented properly
- All valves are installed correctly and in the right positions
- The system is properly secured to the roof
- Screws and bolts are secure, and penetrations sealed
- All pipework has been properly secured and supported
- All collectors have been secured top and bottom with Barb Locks
- Check for leaks and/or weeps
- The system will automatically drain or is installed with manual drain valves
- Drain Down Kit is installed
- The Automatic Controller (if installed) has been switched on with no fault codes
- Pump is primed

If you come across any issues check the ‘Troubleshooting Guide’ at the back of this manual.

TROUBLESHOOTING GUIDE

ISSUE	CAUSE/S	SOLUTION/S
Air bubbles are constantly appearing in the pool returns *Note: Air bubbles appearing for a few minutes upon start-up and shutdown is normal*	Air is entering through a leak on the supply side of the pump	Check that the pumps filter basket lid is on tight. Clean, lubricate or replace the O-ring on filter basket if required. Look inside the pumps lid for air bubbles appear. If present, run water over the lid and joints and see if the bubbles stop. If they do, locate, mark and fix the leak/s. If the pump doesn't have a clear lid – repeat the above process listening for a smoother operating sound. If the pool is using a suction type pool cleaner, try removing it. If the bubbles stop only use the cleaner while the system is turned "OFF
	There is a leak somewhere in the system	Check the entire system for leaks, paying special attention to the glue joints, valves, and rubber couplings. Locate, mark, and fix any leaks.
	Air is entering through the Vacuum Relief Valve	There is insufficient water pressure in the system. This results in the valve failing to close, and air being drawn into the system. Remedy the issue by cleaning and back-washing the filter to reduce pressure. If this fails, consider installing a Ball Valve on the return line to produce slightly more back pressure on the system.
There is a slight leak from the barbs during pressure testing	There is debris on the seal/s	Mark which collector is leaking and switch the pump off. Using a long, flat tipped screwdriver, carefully remove the barb lock and pull the collector out of the Header Pipe. Inspect to ensure all seals are in place, intact and clean. Replace if required. Once complete, lubricate and reinsert the collector and barb.
The water coming from the return outlets of the pool is not as warm as expected	The water flow is too fast	Install a flow restricting valve along the return line to slow the flow of water through the system. This will allow more time for the water to circulate and heat up. Use a little common sense and do not fully shut the valve.
	The pump is oversized	The pump may be too large for the system. Australian Standards specifies that a pump should deliver 1.8-4.8 lpm per m2 of collector (AS3634 8.1a). Size up for double story homes or if significant flow restrictions exist. Check the calculations and consider installing a smaller pump.
	The system is undersized or incorrectly positioned	Check your calculations to ensure you have installed the right amount of solar collector for your pool. Ensure that the roof is not south facing or heavily shaded. Consider installing a larger solar system.
	Seasonal / Cooler Day	It is also important to note that the pool water will not increase in temperature as much during the cooler months of the year, or on cool, windy or particularly cloudy days. This is due to normal seasonal operation changes and cannot be helped.
There is a small leak in the tube/s	Accidental Damage	Purchase a '10T or 50T Solar Repair / Trim Kit' from Clark Rubber (you may also wish to purchase a TufTool Rigid Collar Tool for ease of installation). Mark the position of the leak. Shut off the pump. Cut a 3mm section around the leaking tube (do not damage the other tubes). Using your pointy nosed pilers strip out the connecting webs on either side of the leak by approximately 100mm. Slide a Collar on each side of the tube, making sure the shoulder is facing the cut end. Spray some silicone down into the tubes and onto the barb. Insert the barb into each tube, leaving a 2-3mm gap from the end (If you push it too far the collars will be difficult to install). Using your fingers, slide the collars on as far as you can. Then use the TufTool to ensure full engagement.
	Manufacturing Defect	Please take images and/or videos clearly showing the issue and send them through your local Clark Rubber store along with proof of purchase.

CARING FOR YOUR TUFLOCK SYSTEM

Servicing and maintaining the system is essential for its health and longevity. The following table displays a service and maintenance schedule that is recommended to be followed by the homeowner.

SERVICE AND MAINTENANCE SCHEDULE	MONTHLY	QUARTERLY	ANNUALLY
TufFilta / Strainer Depending upon your pool usage and level of debris, the TufFilta / Strainer will need to be checked and cleaned regularly	✓		
Check the System: Check the system for leaks on a regular basis throughout the season as leaks can corrode metal roofs and gutters, if left unchecked. Leaks should be repaired as soon as possible.		✓	
Vacuum Release Valve The vacuum release valve is a critical system component. It should be checked that it is functioning correctly and that collectors drain fully when the pump stops. The collectors and/or piping should never appear collapsed (concave) by negative pressure.			✓
Plumbing Degradation Plumbing should be checked for signs of UV and/or chemical damage. Replace as needed.			✓
Debris Accumulation Check that there is no build-up of debris around pipe work or collectors, and that rainwater has a clear path to run down.			✓
Wintering System You may need to prepare your system for winter dormancy each year.			✓

NCS POOL HEATING SYSTEMS

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