# INSTALLATION & OPERATING MANUAL



ATLAS FILTERS

Patent No. 5847 43, 7795 48, & 7694 41. Patent Application No. 2002 307 607

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# PREFACE

**Before installing or using your Atlas® Filter System, please take the time to read these Instructions carefully. The information contained within this Booklet will help you obtain all of the benefits and the performance that is built into your Atlas® filter. Your study of these instructions will also reduce unnecessary exposure to service costs that cannot be considered as a warranty provision.**

**1.** If in any doubt, we urge you to seek further advice before installing or operating this product. The Atlas® Filter Company Australia, strongly recommends that all installation and service work is undertaken by a pre-qualified and experienced Contractor. Similarly, the Atlas® Filter Company strongly recommends the services of an accredited Consultant or Designer, who is experienced with swimming pool system design.

**2.** Throughout these Instructions, any reference to "Atlas® Filter Company, Australia" should be read to mean the same as (and be synonymous with) the business Company name "Fulham Engineering Services Pty Ltd (ABN 18 003 180 630)".

**3.** The information provided within these Instructions supersedes all previous information. Whilst this current information is the best available at the time of publication, it may be subject to future revisions. The Atlas® Filter Company, Australia assumes no responsibility for the use of this information. It is the installing Contractors (and or the Owners) responsibility to verify the existence of any current Specifications and or requirements, prior to undertaking any work or procedure. Similarly, no liability shall be accepted for any potential errors, inaccuracies or omissions that might be inadvertently contained within this documentation.

**4.** Atlas® filters are manufactured in Australia, under a Manufacturing Agreement that entitles the use of the following:

- Australian Patent No 584743 - Filtering Unit
- Australian Patent No 779548 - Liquid Filter using a Filtration Aid
- Australian Patent No 769441 - Filter Element for a Liquid Filter using a Filtration Aid
- Australian Patent Application No 2002307807- Support Structure for Holding Filter Medium

In accordance with all Patent rights and privileges, the Patent Holder will actively pursue any infringement on the above Patents. For this reason, formal Notice is hereby provided that infringement of any type will have the potential to attract harsh penalties and substantial costs.

**5.** Copyright associated with this documentation, is owned by the Atlas® Filter Company. These Instructions or parts thereof shall not be used or reproduced (in part or full) without the written permission of the Atlas® Filter Company.

**6.** Prior to the proposed handover date, the Installing Contractor should issue these Instructions to the Pool Owner, with any other information that he may be obliged to provide as part of the installation Contract. Additional copies of this documentation are available, upon request.

**7.** These Instructions relate to substantially different sized filters, ranging from Model PCT65 to Model PCT800. Given the generic nature of these Instructions, they should be read in conjunction with the relevant Data Sheets and or Sales Outline. The use of any specific Filter Models shall be as defined within the Supply Contract.

**8.** Given the commitment by the Atlas® Filter Company to provide the best possible information, we welcome all comments and advice from Installing Contractors and Pool Operators, alike. Send your suggestions to **service@fulfab.com.au**.

# 1.0 INTRODUCTION

## 1.1 Product Attributes & Process Benefits

**Congratulations on your purchase of an Atlas® filter.** This product has been especially designed and manufactured for swimming pools of all types and sizes. Apart from being suitable for new facilities, Atlas® filters also provide a sound basis for upgrading older swimming pools that are required to conform to current best practise. Even without any significant improvements in flow rate, the process efficiency of an Atlas® filter system will substantially improve the water clarity of older/existing pools.

The performance of your Atlas® filter has been carefully ascertained and has been proven in many other similar applications. Coincidentally, many of Australia's premier swimming facilities use and rely upon the performance of Atlas® Regenerative Precoat Filters. Atlas® filters are proven means of obtaining the two-micron retention (and the sparkling water clarity) that is unique to a modern precoat pressure filter.

Apart from reaching a far higher degree of clarification much quicker than other forms of filtration, Atlas® filters also provide many environmental benefits. Typically, Atlas® filters will provide optimum clarification, without the use of any chemically complicated coagulants. Atlas® filters also consume far less washwater and they are frequently used as the basis of minimizing water use. Reduced washwater consumption, means a lower heat loss, less water-balance chemicals, and lower (incoming and outgoing) water costs. All of these process benefits contribute to maintaining lower operating costs, due to the minimization of waste washwater.

With its unique particle selectivity Atlas® filters will physically detain microscopic solids & bacteria. Given its two-micron retention, Atlas® filters can provide protection against modern chlorine resistant pathogens like Giardia & Cryptosporidium. Atlas® filters will also remove chlorine-resistant organisms that can cause swimmer's itch. The efficiency of two-micron retention will simplify pool water chemistry and substantially reduce your reliance upon harsh and objectionable chemicals.

Despite its unique process efficiency (and its subsequent contribution to public health) Atlas® filters are extremely compact. Apart from requiring far less plant space, Atlas® filters can also be operated with substantial smaller balance and backwash tanks. This can result in significantly lower construction costs.

Atlas® filters incorporate proven principles and patented features. They operate by using a replaceable filter media. To make best use of these naturally occurring filter aids, Atlas® filters include a unique non-mechanical regeneration process that extends the media life and reduces the backwash frequency. With simple instruction, Atlas® filters can be safely operated by non-technical personnel.

Atlas® filters are internationally recognized with converted awards like the NSF Seal of Approval, the SABS Design Award, the GQM Quality Award, and the 9th International Technology Trophy. When installed and operated in accordance with Instructions, Atlas® filters will provide many years of trouble free performance.

## 1.2 General Notes

- Unless certified otherwise, the Atlas® filter models described within these Instructions are intended for commercial swimming pools using either fresh or salt water. Other applications (such as water treatment & or industrial processes) are subject to different operating requirements that are customarily, project specific.

- Do not connect a standard Atlas® filter to mains water supply. Custom-made filters are available for this purpose. The operating pressure of a city water supply is customarily far higher than that required for a swimming pool application.

- Keep the filter label in good condition. Be sure to obtain a replacement label, if you discover that the filter label is damaged or is missing. The filter label confirms vital information such as the required media charge and the mandatory backwash flow.

- Record your filter's serial number in a suitable asset register. You will need this serial number to obtain future service and or spare parts. Important, project specific information should also be recorded within **Section 10** this Manual.

- Trapped and compressed air inside a pressure vessel can cause serious damage and risks - ensure that all air is out of the system before testing and or operating the system. Conversely, excessive vacuum may cause implosion – install all vacuum breakers and vents that are necessary to ensure that the filter is not subject to vacuum, excessive pressures, or sudden surges (water hammer).

- Given the high process efficiency of your Atlas® filter, flocculants of any type are not required; nor should they ever be used. Flocculants and or coagulants are chemically complicated chemicals that primarily intended to improve the performance of other (less efficient) forms of filtration. The use of heavy-metal flocculants will often complicate and compromise the disposal of washwater and they are not be used with Atlas® filters.

- If fitting a “salt water chlorinator” (or any other similar device) great care must be taken to ensure that the appliance is installed in strict accordance with that manufacturer’s Instructions. Such work should also comply with any local Codes and or Standards that may be applicable.

- Salt-water chlorinators must have some form of “gas trap” or safety device. Failure to adequately address these requirements could affect your safety and result in serious product damage and personal injury.

- When installed and operated according to instructions, the Original Equipment Purchaser (OEP) is provided with a Warranty that provides an undertaking that the product is free from manufactured defects. This Warranty is not transferable, without the equipment Manufacturer’s knowledge. Transfer of Warranty (to a third party) will commonly incur extra costs. Similarly, extended warranty periods are available at extra cost, if so required.

- This product does require regular service and maintenance. Work of this type is commonly best undertaken by an Authorised Service Company. Notwithstanding any legislation or legal rights that may be available to you, the use of non-genuine spare parts will automatically void any warranty commitment.

- Do not operate or change any plant or equipment settings unless suitably trained or qualified. Any operational problems, water leaks, or anomalies must be reported and attended to, as soon as they first become apparent.

- Improper or negligent operation of a filter plant can result in costly damage to numerous system components. It is essential that the installed filter plant be correctly operated and maintained at all times. Product Warranty is conditional upon correct installation & operation. Correct operation includes the maintenance of appropriate water chemistry.

## 1.3 Notes, Cautions & Warnings

To highlight the varied significance of key issues, different symbols are used throughout this Manual. The broad meanings of these symbols are as follows:



**NOTE**
This symbol is used to highlight important information, which could affect the operation and the performance of your filter.



**CAUTION**
This symbol alerts you to situations that could result in equipment damage. It is important to note that the warranty provisions that are available with this product may not cover damage resulting from improper use or failure to operate in accordance with Instructions.



**WARNING**
This symbol indicates potential danger and or risk that could result in personal injury. As recommended within this Manual, the product should be installed & services by an experienced Contractor, who has a complete understanding of all procedures and Method Statements that are required to install “mechanical piping systems” in a safe and efficient manner.

## 1.4 Supply Scope & Delivery Method

The components supplied with your filter system will vary according to details contained within the supply Contract. Check that all components have been delivered and that there are no signs of obvious transport damage. Read the identification label that is affixed to individual filter(s) and confirm compliance with the supply Contract. Report all claims in writing within seven days of the delivery date.

“Delivery” and or “point of delivery” are defined within the supply Contract. Filters are commonly consigned on an ex works basis, wrapped and packed. Shipping details for specific filter models are confirmed by relevant product/sales drawings.

Subject to the size of the product, Atlas® filters are strapped to a standard (or an over-size) timber pallet. Notwithstanding this packing method, the Purchaser is required to advise his freight company that the load is top heavy and it must be handled by experienced and qualified persons. When using a forklift, the load is be secured to the forklift’s mast. Persons lifting or moving an Atlas® filter must be qualified and authorized for such work.

Filter Models PCT460 and above, are not palletized due to their physical size and their shipping weight. In these cases, the filter must be secured to the transport vehicle using appropriate metal chains and tension levers. Filter Models PCT460 and above are fitted with tie down lugs specifically for this purpose. Filter Models PCT460 and above are generally transported (under the Purchaser’s Instructions) direct to site by self-loading vehicles (eg. a Hyabb type).



**WARNING**
Atlas Filters are top heavy & are to be handled by experienced & qualified persons. Failure to use appropriate procedures has potential to create product damage & personal injury.

To avoid compression set (of the filter’s main body gaskets) the high-tensile fasteners that secure the filter lid to the filter body are tightened to obtain minimum-compression. During transport, it is possible that these fasteners may become loose. Before attaching any lifting equipment (to the lifting lugs that are provided on the Lid of most filter models) it is imperative to check the integrity of the flanged Lid to Body connection.

Do not over tighten the fasteners that connect the filter lid to the filter body. One full turn beyond finger tight is sufficient to ensure an effective connection. If further tighten of the fasteners is required, this should be done in a star pattern, which ensures even pressure. Instructions for Filter Lid Tightening are provided within **Section 8.5**.



**WARNING**
Check the integrity of the bolted flanged joint, before using the lift lugs that are provided on the Filter’s Lid.

Filters without lifting lugs (on the filter lid) should remain on their transport pallet and moved into position using a forklift or a pallet truck. Filter accessories and sundry items (air release, pressure gauge, face plumbing, precoating plant etc.,) are generally shipped within a separate supply container/box that is despatched with the filter vessels. These components should be safely stored, until required for the final installation.

## 1.5 What You Will Need To Complete The Installation

- Applied experience and a complete understanding of all procedures and Method Statements that are required to install “mechanical piping systems” in a safe and predictable manner. These Instructions do not provide any specific information relating to pipe installation methods, valving fitting procedures, pipe supports, and or pipe bracketing. These and other similar requirements are deemed to be understood by the trade qualified Installer.

- A design, a diagram, or sketch plan, detailing how the filter is to be arranged to best suit the final plumbing connections. The installation works broadly requires connection to the filtered water line, the soiled water line (from the pump) and the wastewater line (to a Backwash Detention Tank). The extent of plant piping will be dictated by the specific project requirements.

- Project specifications including copies of any relevant Standards, Guidelines, and Codes relating to mechanical plumbing, filtration, water treatment, and other related topics.

- An adequate supply of all necessary pressure pipe, pipefittings, supports and brackets - to suit the project's design.

- Material handling equipment, tools, and standard consumables (including Teflon tape, solvent cement, anti-seize lubricants, cleaning agents, gaskets, bolts and nuts, etc.,) that are deemed necessary for mechanical plumbing work.

# 2.0 PLANNING YOUR INSTALLATION

Optimum performance is dependant upon the use of appropriately sized filters and good system design. If a detailed design is not available, we recommend that advice be obtained from an experienced Pool Consultant or System Designer. Alternatively, contact your authorized Atlas Contractor for further information. The capability of different sized filter models is confirmed within **Table 1**.

## Table 1: Atlas® Product Range

| PCT Model | 65 | 80 | 100 | 135 | 150 | 175 | 200 | 300 | 400 | 460 | 600 | 800 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Filter Area (m2) | 6.5 | 6.5 | 9.25 | 13.75 | 15 | 17.5 | 20 | 30 | 40 | 46 | 60 | 80 |
| m3/hr Flow @ 3m3/hr/m2 | 19.5 | 19.5 | 28 | 41 | 45 | 52.5 | 60 | 90 | 120 | 138 | 180 | 240 |
| m3/hr Flow @ 5m3/hr/m2 | 32 | 32 | 46 | 67 | 75 | 87.5 | 100 | 150 | 200 | 230 | 300 | 400 |
| No of Candles | 37 | 37 | 37 | 55 | 82 | 82 | 82 | 121 | 161 | 187 | 241 | 321 |
| Nom Shell Diameter (mm) | 880 | 680 | 680 | 750 | 1020 | 1020 | 1020 | 1210 | 1400 | 1470 | 1650 | 1960 |
| Backwash Flow (l/sec) | 9 | 9 | 13 | 19 | 20 | 24 | 28 | 42 | 56 | 64 | 84 | 110 |
| Wash Water (m3) | 1.0 | 1.0 | 1.5 | 2.3 | 2.5 | 3.0 | 3.5 | 5.0 | 6.5 | 7.5 | 10 | 13.5 |
| Min Media Charge (kgs) | 3.5 | 3.5 | 5.0 | 7.5 | 8.5 | 9.6 | 11.0 | 16.5 | 22 | 25 | 33 | 44 |
| In/Out Connection (mm) | 65 | 80 | 100 | 100 | 100 | 100 | 150 | 150 | 200 | 200 | 200 | 250 |
| Approx Overall Height (mm) | 1400 | 1500 | 1780 | 1725 | 1725 | 2085 | 2030 | 2130 | 2305 | 2315 | 2330 | 2400 |
| Minimum Backwash Tank (m3) | 1.25 | 1.25 | 2.0 | 3.0 | 3.5 | 4.0 | 4.5 | 6.5 | 8.5 | 10.0 | 12.5 | 18.0 |
| Shipping Weight (kgs) | 80 | 200 | 220 | 100 | 380 | 440 | 645 | 645 | 925 | 1130 | 1685 | 2595 |
| Shipping Cubic (m3) | 1.1 | 0.9 | 1.0 | 1.3 | 2.35 | 2.6 | 2.8 | 3.9 | 5.5 | 5.8 | 7.8 | 9.6 |
| Service Weight (kgs) | 500 | 650 | 780 | 750 | 1510 | 1690 | 1840 | 2625 | 4125 | 4610 | 6175 | 8145 |



**TABLE 1 NOTES**

- The above Specifications may change without notice. Other models & filter areas are available upon request. Refer to your original Supply Contract for other specific details.
- The media requirements quoted above are based on using Celite® Grade 545 with a minimum dose rate of 0.55kgs/m2. This dose rate may be legitimately increased up to 0.75kg/m2. Where possible, the required media charge should be established on the basis of using the full contents of the supply carton/bag.
- Different dose rates apply to different filter aids. Perlite dose rates are approximately 50% lower than Celite® due to differences in density, albeit the same volume of media volume is used.
- Models PCT65, PCT135, PCT175 & PCT200 are available with FRP filter shells.

The broad planning issues associated with the installation of an Atlas® filter include the following:

## 2.1 Plant Capacity

The flow rate for a particular application may be determined by reference to State or Territory based Codes and or Guidelines. Given the current lack of any national Standard, the required plant capacity (or pool turnover rate) may vary substantially, depending on the location and the relevant jurisdiction. Given the unique particle selectivity provided by Regenerative Precoat Pressure Filters, it is also possible that an Atlas® filter may not need to operate at the same recirculation rate, as other (less efficient) forms of filtration.
Having established the required recirculation rate (in m3/hr), the Pool Consultant or Designer will commonly

establish a filter loading (or filter rate expressed in m3/hr/m2) that is considered suitable for the particular application and or its design.

Whilst many State and Territory based Codes and Guidelines will promote a flow rate required for various pools and or water depth, they do not necessarily provide a filter loading or a filter rate. In some cases, an experienced Pool Consultant or a Designer will determine that lightly loaded or seasonal pools be operated at a maximum filter rate of 5 m3/hr/m2.

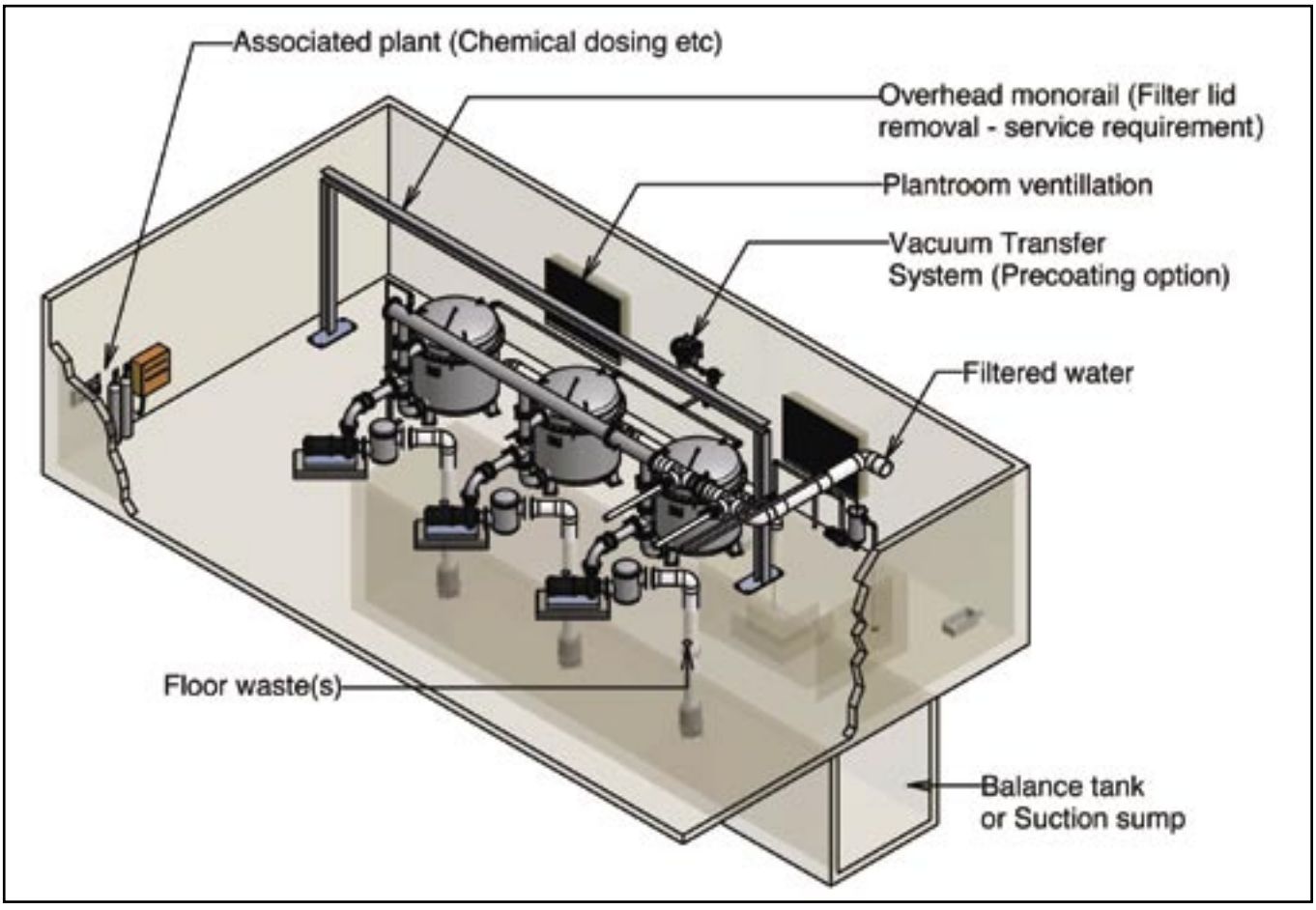
Notwithstanding the above, the filter loading for an Atlas® filter can legitimately vary between 3 m3/hr/m2 and 5m m3/hr/m2. Slower filter rates are generally recommended to provide the benefit of a longer cycle time. Given that the major work (in operating a precoat filter) is related to the backwash (and the subsequent precoat) process, the filter run time will have a direct impact on any perceived labour-operating costs. Logically, a longer the filter cycle means less backwashing, and generally lower operating costs.

When operating with a filter loading of 3m3/hr/m2, the filter run or cycle time can be up to twice as long, as when operating at the higher rate of 5m3/hr/m2. When operating at the slower filter rate, the potential savings in labour, power, and filter aid should be tempered against the higher capital-cost of a larger filter system. These are intricate value judgements that are best processed by an experienced Consultant or Designer. When applications are subject to high-risk or heavy bather loads, the use of slower filter rates are recommended and technically warranted.

**NOTE**
The use of slower filter rates will provide the benefit of longer filter run times.

As indicated in **Table 1**, there are twelve (12) standard filter models included within the Atlas® product range. Whilst many projects, can be comfortably satisfied with the use of only one filter vessel, project requirements and or design, can dictate the use of multiple vessels arranged as a filter bank. Refer Figure 1 depicting a multiple filter installation with the outlet of each filter feeding into a common Filtered Water (FW) return line.

## Figure 1: Typical Use of Multiple Filters



## 2.2 Plant Room Requirements

Select an accessible plant space that is adequately ventilated and well drained. To protect your pool plant and its finishes, pool chemicals should be segregated and stored away from the main filter plant. In poorly ventilated plant rooms, it is advisable to protect the exterior of all metal products and or components with an approved paint/coating system.

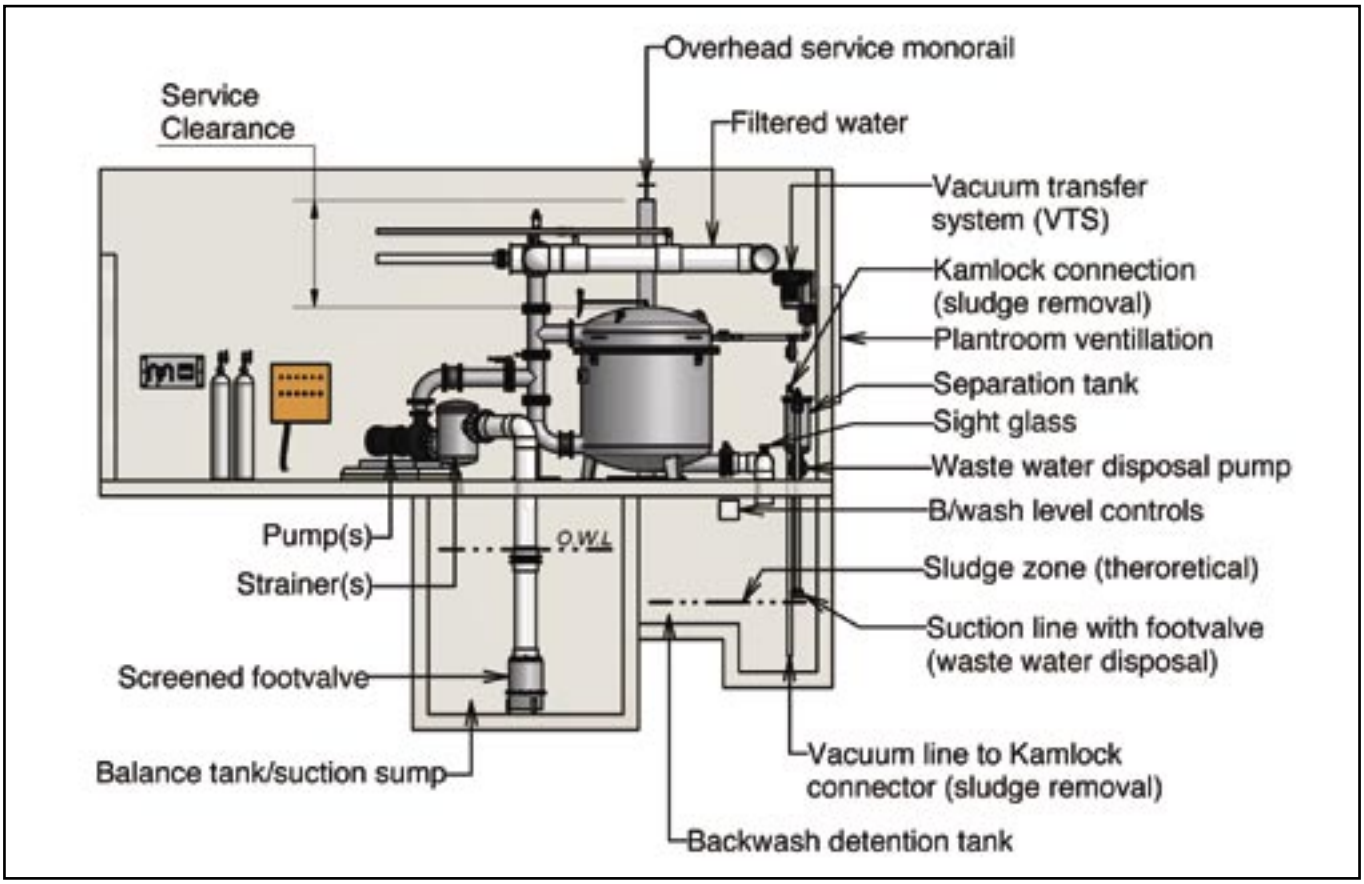
Your Atlas® filter should be located on a level concrete slab with the filter valves located in convenient position for the installation and the future operation of the valves. Metal filters should be bolted to the plant room floor slab and grounded (equipotentially bonded) to avoid potential corrosion issues due to stray electrical current. The design of the plant room requires careful planning and co-ordination with incoming services and other associated equipment. The extent of related equipment will vary according to your system design.

Whilst the service weight of an Atlas® filter is substantially lower than other comparable filtration (of equal size/ capacity), the plant room floor slab requires structural design. Subject to design, the plant room floor slab may be located above or below the pools operating water level. When located below the pools operating water level, it is often prudent to supplement the floor drainage system with a suitable flooding protection system. This can be as simple as a low-voltage float switch that is installed in an accessible drainage sump. Activation of the float switch can be used as the basis of an alarm and or electrical isolation of the plant.

In order to maintain your Atlas® filter in peak operating condition, the filter will require periodic service and maintenance. Such work will require removal of the filter head, the pressure plate and the filter elements. To facilitate this type of service, adequate clearances must be provided above and around the filter vessel. Refer to sales outline sheets confirming the physical dimensions of particular filter Models.

**NOTE**
An approved Service Agent should undertake maintenance & Major Service work.

### Figure 2: Typical Plantroom Section



Subject to the particular filter model being used, mechanical lifting equipment is considered a mandatory requirement. This equipment may be in the form of a structural eyebolt or a fully serviced monorail with girder trolley and a given number of chain blocks. Refer to www.bullivants.com for details on mechanical lifting equipment.

In accordance with local Laws & ordinances, all lifting equipment should be certified (by appropriate persons) for the relevant Safe Working Load. For a lifting hook, the minimum clearance from the top of the filter tank is 1050mm. For a monorail and girder trolley, the minimum clearance above the tank is 1500mm. Refer to **Table 1** for filter heights. Refer to **Figure 2** for a typical plant room section.

## 2.3 Backwash Provisions

The performance of a filter plant is directly related to the efficiency of its backwash-cleaning process. The supply of adequate and appropriate backwash facilities is a fundamental design requirement. Each filter model within the Atlas® product range requires a specific backwash flow that must be provided by the Installing Contractor, without undue restriction or backpressure. Given the extent of the required backwash flow (and its duration) a Backwash Detention Tank is considered a fundamental requirement.

Ideally the Backwash Detention Tank should be located below the plant room floor slab. In cases, where this is not practical, a suitable floor drain should be provided to permit drainage of the Atlas® filter by gravity. This is an essential requirement for the Vacuum Transfer System that is recommended within **Section 5.2**. Drain down of the filter (prior to backwashing) will also enhance the effectiveness of the backwash process.

Unless approved otherwise “used” filter media and collected debris should not be discharged direct to sewer. In some parts of Australia this approval may not be unreasonably withheld. In other cases, a mechanism should be provided to collect these wastes. The Backwash Detention Tank provides an ideal mechanism to collect and detain solid wastes. Collected solids should be processed in accordance with a Trade Waste Agreement that is structured to satisfy the requirements of the local Authority.



**NOTE**
Failure to provide adequate backwash conditions will prevent the filter from being adequately cleaned. This will ultimately affect the filter’s performance.

The Backwash Detention Tank should be sized to accommodate the specified washwater consumption from a single filter with a further allowance for sedimentation, plant over-run, and freeboard. The geometry of the Backwash Detention Tank should be designed to encourage sedimentation within a localized collection zone or sump. This will facilitate the subsequent removal of the collected/detained solids.

Settled washwater is customarily processed by wastewater disposal pump (usually rated at 2 l/sec). Operation of the wastewater disposal pump is commonly controlled by appropriate level controls and time delay, whereby only settled Clearwater is discharged to waste. The remaining solid-wastes should be periodically removed from the Backwash Detention Tank in accordance with an approved Trade Waste Agreement. Commercial cleaning contractors will commonly provide this type of de-sludging service. As an assurance that solids are not inadvertently discharged to sewer, a bag filter is usually installed within the wastewater discharge line. Bag filters should not be installed within the backwash line.

An effective backwash system will usually include numerous controls that are designed to satisfy local requirements. Such controls will commonly include a water meter (totalizer) which records washwater disposal. Subject to the local Authority’s requirements, “time of day” restrictions may also be imposed on the discharge flow to sewer.

Whilst the “filter rate” for an Atlas® filter may legitimately vary, a specific backwash rate of 5m3/hr/m2 is a mandatory requirement. Failure to backwash at the required flow rate will result in an accumulation of solids (inside the filter vessel) that will ultimately detract from the efficiency of future operating cycles. Refer to **Table 1** for details on the mandatory backwash flow. The required backwash flow for your filter is also noted on the filter’s Identification Label.

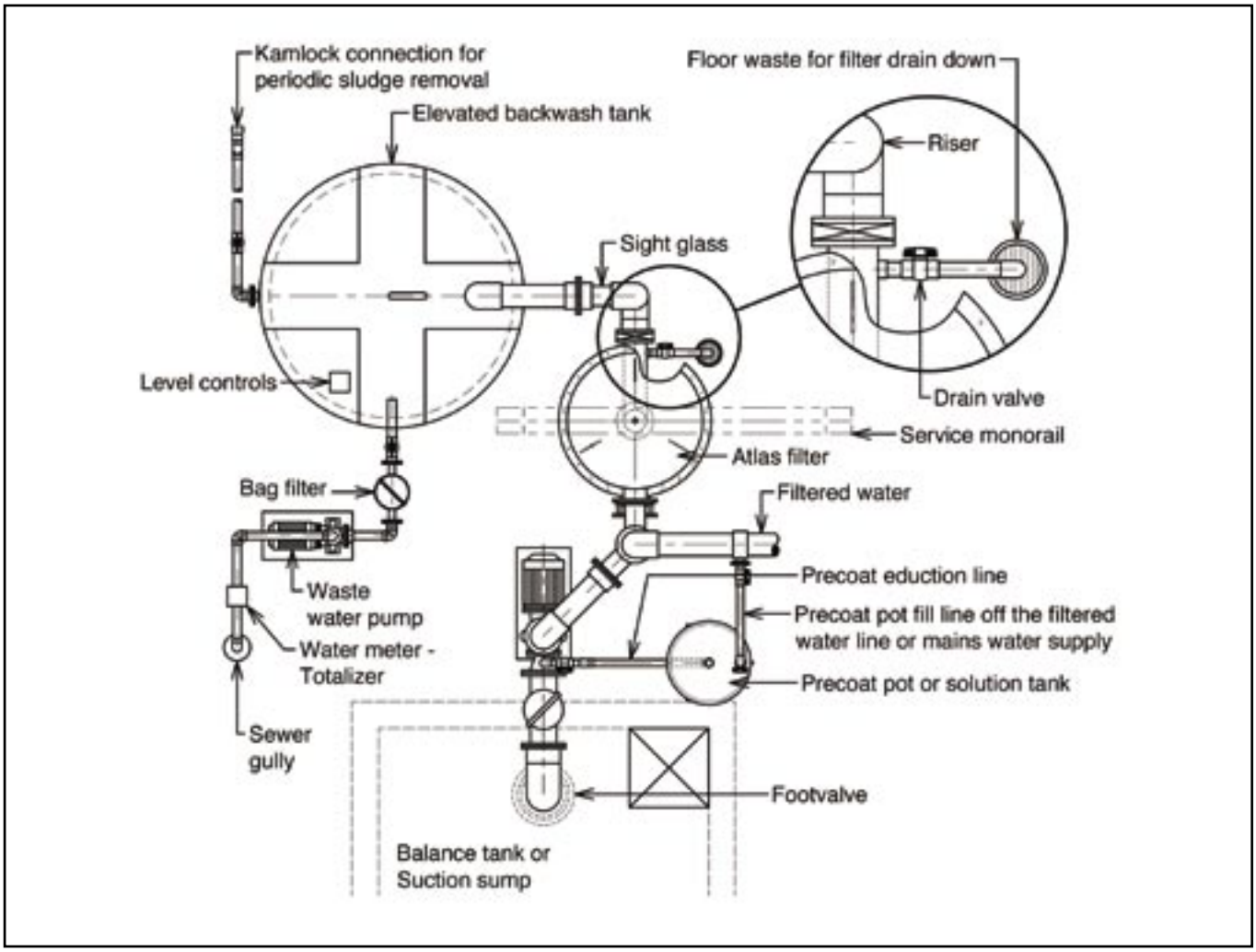
## 2.4 Precoating Options

The precoating requirements for a particular filter will vary according to the size of the filter and the amount of filter aid that is required. **Table 1** confirms the minimum media charge for particular filter Models (based on a dose rate of 0.55kgs/m2 of filter area) when using Celite® Grade 545. Heavier dose rates are possible and are encouraged to permit the full use of standard package sizes, where possible. The higher allowable dose rate of 0.75kgs/m2 is also, often advantageous when first starting up a new filter.

For filters requiring a media charge of 4.5kgs or less, it is not uncommon that the plastic supply bag (containing the filter aid) is opened under water within a small solution tank or bucket. This procedure will substantially obviate any issues associated with the possible inhalation of fine dust.

In the above case, the filter aid is then mixed to form thin slurry and is then poured directly into a skimmer box. For projects using a balance tank (and or a suction sump) the mixed slurry is educted into the main suction line immediately in front of the recirculating pump. Subject to the size of the precoat pot/solution tank, the same methodology can also be used for a media charge of up to 11kgs or less. Refer to **Figure 3** depicting the typical use of precoat pot/solution tank.

## Figure 3: Small Scale Manual Precoat From Precoat Pot/Solution Tank




The concentration of above precoat slurry should typically range from 0.3% to 0.6%. If they are much lower than 0.3%, precoating may be difficult, since the formation of a successful filter cake depends partly upon a “crowding” effect with the fine particles of the filter aid competing to get through larger opening of the filter cloth.

Whilst alternative, large-scale precoat methods are available (using either a venturi or a bag loader/bulk mix

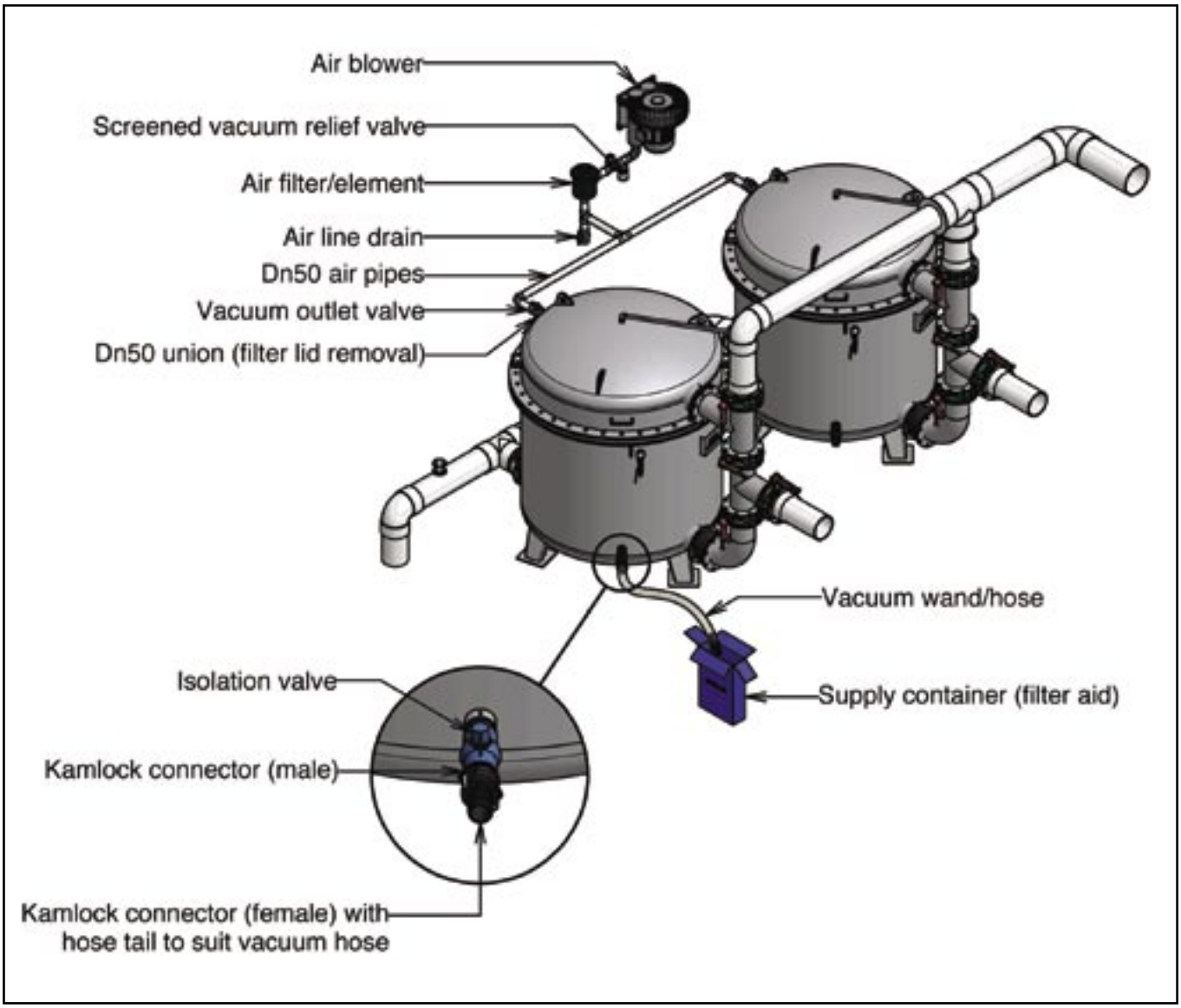
tank) this particular set of Instructions, relates to the use of a Vacuum Transfer System. This is an innovative and virtually a dust free method that reduces the handling and the mixing of conventional precoat slurry. When using a venturi or a bag loader/bulk mix tank, refer to the Instruction Sheets relating specifically to this type of precoating plant.

As shown in **Figure 4**, the Vacuum Transfer System comprises a single stage air blower, high efficiency air filter, and vacuum hose/wand. Subject to design, a single Vacuum Transfer System is capable of servicing up to three PCT200 Atlas® filters. A Vacuum Transfer System requires the filter vessel is capable of being drained after the backwash process. When the single stage air blower is set into operation, it will create sufficient vacuum whereby dry filter media can be drawn into your Atlas® filters. This methodology substantially reduces any exposure to airborne dust and it generally is an easier and cleaner method of precoating.

Note that a minimum upward velocity of 1.4m/min is required for the proper suspension of the filter aid. Providing that the filter rate is between 2.4m3/hr/m2 and 5m3/hr/m2, effective precoating can be expected. When lower than 2.4m3/hr/m2 some difficulty may be encountered in obtaining complete coverage of the filter candles. Similarly, when operating higher than a rate 5m3/hr/m2, some erosion of the filter aid could be expected. This also would result in some filter candles not being effectively coated.

The selected precoat method will dictate the equipment that is supplied with your Atlas® filter. Refer to your Supply Contract for further details.

## Figure 4: Vacuum Transfer System (General Arrangement)



## 2.5 Pumping Equipment

Whilst associated pumping equipment will commonly be a specified item, it is required to be a single stage, centrifugal volute pump with an axial suction port and a radial discharge port. The selected pump should conform to either ISO or DIN Standards. Pumps of this type will produce a variable flow, depending upon the resistance at which they are required to operate. Given the filter's available pressure rise for cleaning purposes (75kpa) careful pump selection is required. The selected pump will either be long or closed coupled, powered by a 1450RPM drive motor. Whilst motors of up to 4kW may be installed with DOL starters, electronic reduced-voltage starters (soft starters) are generally recommended for all motor sizes of 4kW and above. The use of soft starters will substantially reduce the electrical and hydraulic impact of starting and stopping the pump.

As stated in **Section 2.2**, your filter plant may be located above or below the pool's water level. Pump location will affect pump selection due to suction lift and or static negative head. As a general rule, the recirculating pump should be installed no higher than 1.5m above the Operating Water Level (in either a balance tank or a pool). Similarly, the filter plant should be installed no lower than 6m below the pool's True Water Level (TWL).

If located above the system's Operating Water Level (OWL), the recirculating pump will require an approved footvalve for pump "priming" purposes. If located below the pools TWL isolation valves will be required to permit future servicing of the plant.

Recirculating pumps should be equipped with suitable pre-pump strainers and standard hardware (such as flexible connectors, vacuum and pressure gauges, smooth-bore conical reducers, and a manual flow control valve). Dedicated pumps and motors are required for each filter vessel. The arrangement and the location of the recirculating pump may vary according to design and or specific project requirements.

For best pump performance, the filter system should be located as close as possible to the pool. To ensure adequate pump performance, all suction piping is critical, and great care should be taken to ensure that no leaks exist. Entrained and incoming air will adversely affect filter performance and it can have potential to detract from apparent water clarity. Appropriate pipe sizes, good connections, proper supports, and thorough testing are fundamental requirements of a good installation.

When selecting a recirculating pump it is important to choose a pump that has a comparatively steep characteristic curve. Good design will often select a pump casing that will permit the use larger impellers, if found necessary by the installed conditions. The selected pump will commonly provide a shut-off head in the order of 20m head. The principal objective with pump selection is to provide sufficient head (pressure) to accommodate the filters pressure rise (75kPa) without being exposed to wide/excessive variations in flow. With flat characteristic curves, the system's flow may be subject large flow-variations, according to the changing condition of the filter (viz., clean or dirty).

Pumps are commonly selected according to the required backwash flow. With appropriate design and pipe sizing, the backwash duty point can typically occur at 10m head. Slower filter rates can customarily be provided with suitable flow controls and or other methods, including Variable Speed Drives. When using flow controls to establish a slower filter rate, this will typically occur at a higher system pressure. As the filter collects solids, the flow control valve may (in this instance) be progressively inched-opened to maintain an optimum system flow with longer filter run times.

The pressure drop through a clean filter will vary according to the selected filter loading. At a filter rate of 3m3/hr/m2, the pressure drop through a clean filter is 20kPa. At a filter rate of 5m3/hr/m2, the pressure drop through a clean filter will be 35kPa. Much of these pressure drops can be attributed to the filters face plumbing and its backwash valving.

The head loss through the filter is only one aspect contributing to the Total Dynamic Head of a particular filter system. The elevation of the filter plant (in relation to the operating water level) and the extent of plant piping (in terms of its length, diameter/size, and number of changes in direction) can be significant factors when determining a system head curve.

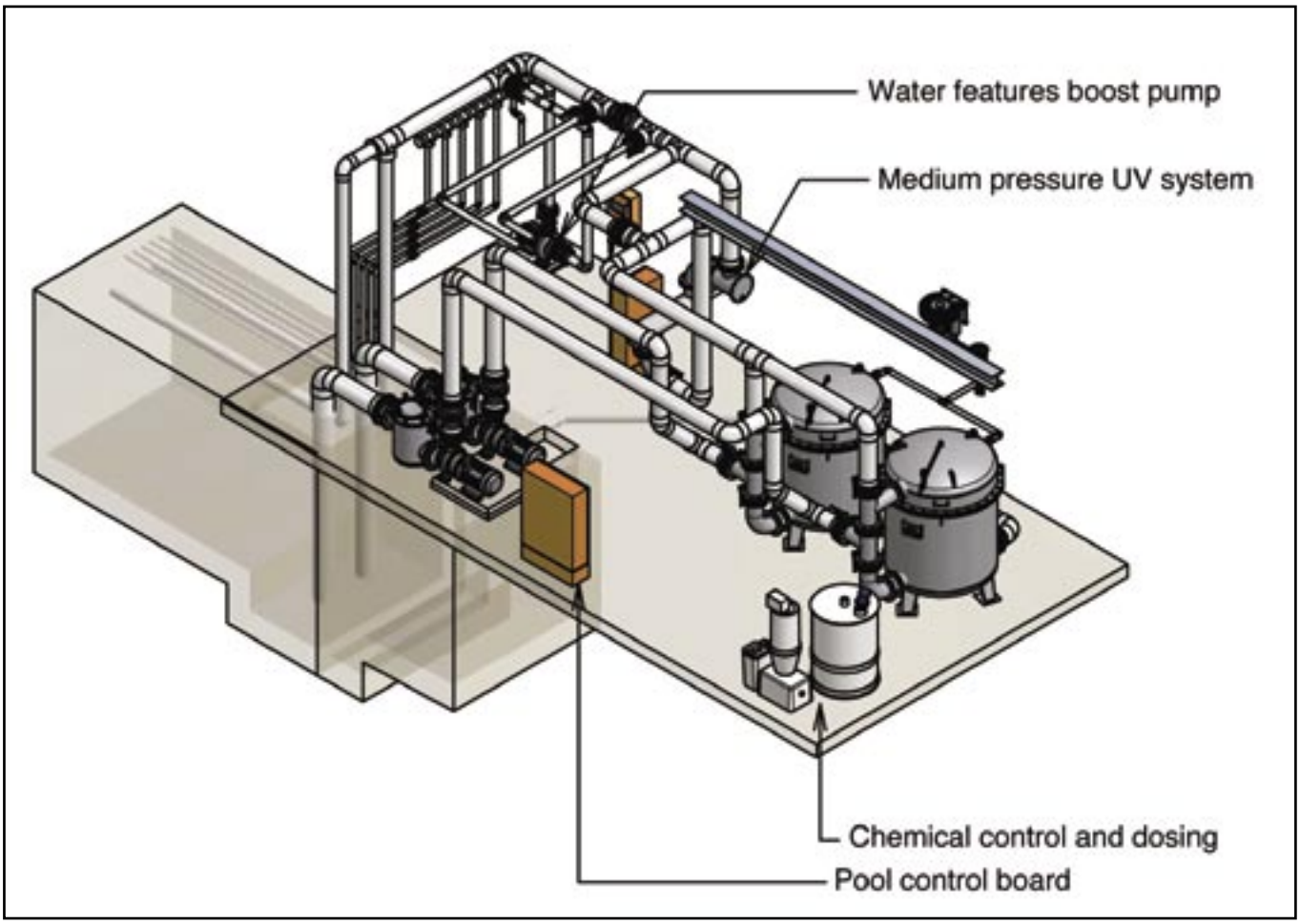
Given the pressure rise for backwashing, system head curves (for a clean and dirty filter condition) should be considered, when making an optimum pump selection. Similarly, efficiencies at both the filter and the backwash duty point should be considered. For assistance with an ideal pump selection, refer to your authorized Contractor or your pump supplier.

## 2.6 Interfaces with Other Equipment

As shown in **Figure 5** your Atlas® filter will be commonly installed in conjunction with other equipment that will require substantial plant piping.

Importantly, pool heating plant and chemical dosing plant must be installed downstream of the filter plant. Pool heating and chemical dosing plant are required to be electrically interlocked, whereby their operation is linked to and conditional upon the operation of the main recirculating pump(s). As a second layer of protection, no-flow switches are required to be installed on the discharge side of the recirculating pump(s). When a lack of plant flow is detected, the required flow switches are required to automatically shutdown the pool heating and chemical dosing plant.

## Figure 5: Interfaces With Other Equipment




If fitting a salt-water chlorinator into your system (or any other similar device) great care must be taken to ensure that the appliance is installed in strict accordance with the manufacturer's instructions and any local Standards and Codes that may be applicable. Salt chlorinators must have some form of "gas trap" or safety device. Failure to address these requirements could affect your safety and result in serious damage, which is no reflection upon the design and or the quality of the Atlas® filter.

**NOTE**
Pool heating and chemical injection must occur downstream of the filter & be electrically interlocked with the main recirculating pump(s).

# 3.0 PRODUCT DESCRIPTION

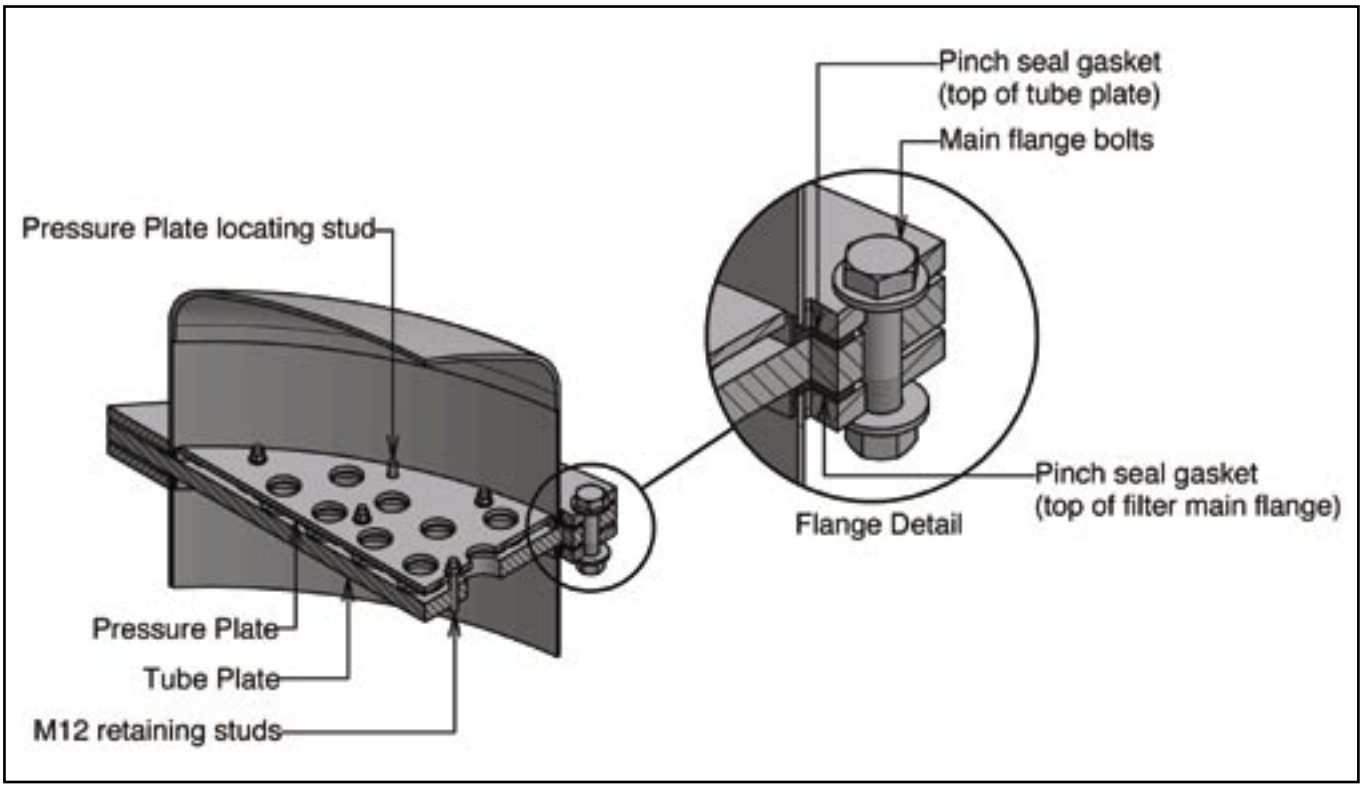
## 3.1 Filter Vessel

Atlas® filters are described as being vertical pressure filters using precoat filter technology in conjunction with a non-mechanical regeneration process. Given its unique particle selectivity, the Atlas® filtering process is sometimes specified as being Ultra Fine Filtration (UFF). Atlas® filters are best described as Regenerative, Precoat Pressure Filters (RPPF). This distinguishes them from vacuum type precoat filters that do not provide the same filter run-time (and the regeneration process) that is inherent with all Atlas® filters.

Atlas® filters are identified as having a down-flow backwash. In the normal filter mode, the filter operates in an up-flow fashion, which assists venting and precoating of the filter. Atlas® filter tanks are designed according to pressure vessel calculations and specific engineering Standards. Filter shells are generally fabricated from heavy gauge stainless steel with specially formed (toris-shaped) tank ends. Select filter models are also available with Fibre Reinforced Plastic (FRP) filter shells. Refer to notes provided in **Table 1**.

As shown in **Figure 6**, Atlas® filters incorporate a structural Tube Plate that divides the vessel into two distinct zones. This division forms a clean-water plenum that is located above the filter's main body flange. The thickness of the Tube Plate varies according to the filter's diameter. Larger diameter filters generally have thicker tube plates.

### Figure 6: Atlas® Tube & Pressure Plate Arrangement



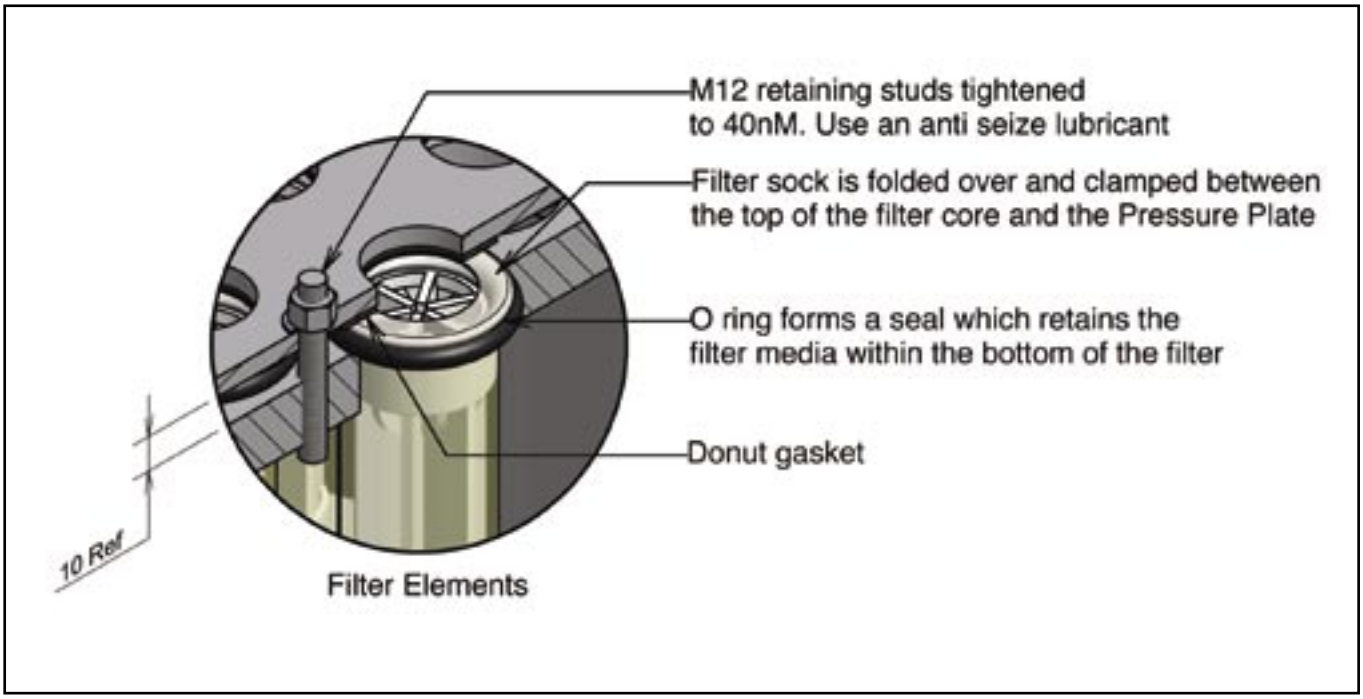

Access inside the filter vessel is obtained via a bolted flanged joint that secures the filter lid to the filter body. The Tube Plate is held between the filter body flange and the filter lid flange and supports a given number of filter elements. Pinch seal gaskets are used on both sides of the tube plate to form an effective pressure-tight seal.

Atlas® filter elements/candles have a robust internal core that is injection moulded from (ABS) engineering plastic. The internal core has thick wall sections, designed to provide long service life. The internal core is cloth-covered with a porous filter fabric/sock that is heat set during its manufacturing process to ensure porosity and integrity.

As shown in **Figure 7**, the tubular filter elements (or candles) of an Atlas® filter are held in place with a pressure plate that is bolted and tightly tensioned to the filter's Tube Plate. The specific number of filter candles within a particular filter model will vary according to the vessel's diameter. Larger filter diameters will logically provide a greater filter area, due to a greater number of filter elements/candles. Refer to **Table 1** for further details.

Each filter element is individually sealed using a flat donut gasket (on the underside of the Pressure Plate) and an 'O' Ring (on the filter element) that eliminates any bypass leakage. In accordance with accepted industry Standards (specifically NSF requirements), the filter elements are spaced 37mm apart. Apart from eliminating any bridging during the filter cycle this working clearance also provides the required space for expansion of the filter bags during a backwash cycle. The generous candle density provided with your Atlas® filter should be accepted as a critical and beneficial design feature.

## Figure 7: Clamping of Atlas® Filter Candles with a Pressure Plate




## 3.2 Filter Cycles – Description

### 3.2.1 Filter Cycle

Soiled water enters the bottom of the Atlas filter via a patented diffuser that creates a strong upward swirling motion. This ensures that the Atlas® filter candles are thoroughly and uniformly coated with filter media at the start of each and every filter cycle. This upward flow also has the advantage that the filter is self-venting. To make best use of this feature, the installing contractor is required to install an automatic air vent at the top of the filter. The use of an auto vent does not detract from the need for a manual air release. This manual (bulk) air release should be used for venting the filter on start-up, whilst the smaller automatic vent is designed to expel smaller quantities of air that could be introduced into the system during normal filter cycle.

Since most of the particles in the filter aid are substantially smaller than the openings of the cloth covered candles, they must form the required filter cake by "bridging" the openings of the filter fabric. These bridges can often be disturbed by air bubbles and or sudden changes in pressure. For this reason, when starting the pump, it is important to use the manual bulk air release. Similarly, the flow rate whilst precoating should established and maintained to be no lower than 2.4m3/hr/m2 but no higher than 5m3/hr/m2. Open the flow control confidently and steadily to achieve the required flow, without any sudden or rapid changes.

As the filter does its job of collecting unwanted solids, these materials will gradually tend to block the filter. This can be observed by a build-up of pressure (on the filter gauge) and a general decline in the pump flow.

### 3.2.2 Precoating Cycle

The various options for precoating an Atlas® filter are generally described in **Section 2.4**. The installation of the Vacuum Transfer System is also described within **Section 5.2**. Regardless of the method being used, precoating is an essential operating requirement that must be performed on initial start-up and after all future backwashes.

Failure to replace the filter media or use the correct media quantities will result in the filter fabric becoming impregnated with impurities. This will reduce the available filter area and reduce the length of the filter cycle. Filter socks that have not been properly coated with appropriate filter media will inevitably need extensive chemical cleaning. This is not covered by any implied warranty or service agreements. Refer to **Section 6.3** for the details on how to precoat.

### 3.2.3 Regeneration Mode

Atlas® filters include a non-mechanical regeneration cycle that is designed to make optimum use of the replaceable filter media. When a filter cycle is periodically interrupted, the collected dirt particles and the filter cake will automatically "fall-off" the filter elements and settle at the bottom of the filter tank. When the filter is re-started, the incoming flow will pick-up and redistribute the used filter media back onto the filter candles to provide yet another valuable filter cycle.

It is important to note that after regeneration, the re-coating of the filter elements/candles occurs quickly. Similarly, this recoating primarily occurs according to particle density, whereby individual grains of the microscopic filter aid will quickly and preferentially re-establish the required filter cake. Regeneration is further described in **Section 6.5**.

### 3.2.4 Backwashing

Filter backwashing is achieved by reversing the water flow through the filter and flushing out the collected dirt and the used media. Specific operating instructions are provided within **Section 6.6**.

When in a backwash mode the water enters at the top of the vessel with a downward flow. As water is forced inside the filter elements, the filter fabric balloons outwards, causes the filter cake and collected dirt to break away from the filter element. Such wastes are then pumped out of the vessel through the backwash connection found at the bottom of the filter.

The backwash procedures provided within in Section 6.6 describe "upper" and "lower" backwashes. An "upper" backwash refers to the reverse down-flow that expands the filter socks and dislodges the filter cake. A "lower" backwash is essentially a flushing cycle that discharges the dislodged filter media and collected solids to waste.

**CAUTION**
After each and every backwash cycle, it is imperative that new filter media be used at the beginning of the next filter cycle. Failure to observe this requirement will result in unnecessary service that is not covered by any warranty provisions.

# 4.0 HOW IT WORKS

## 4.1 Introduction

Atlas® filters provide rapid, single-pass performance. Importantly, this performance is provided without the need for any coagulating chemicals. As soon your Atlas® filter is precoated and brought on line, it will immediately start to collect and detain large quantities of microscopic solids and bacteria. With Atlas® regenerative precoat filters, the filtration results are instantaneous. There is no need to wait for your filter to ripen before it will start to provide efficient clarification and acceptable water clarity.

Atlas® filters operate with a replaceable filter aid that is consumed and replaced after each backwash cleaning process. Each new filter cycle, starts with fresh charge of filter media. Unlike other forms of filtration, this method of operation provides cleaner and healthier filtration, with less risk of microbiological contamination. The fact that other forms of filtration will commonly re-use the same filter for many years should not necessarily be considered as being a process benefit.

Whilst the Atlas® Filter Company, Australia does not market or recommend the use of a particular filter aid, the two most common filter aids used throughout Australia & SE Asia are Celite® Grade 545 or Harborlite® Grade 1500S. Both of these filter aids are industrial products that are sold in bulk bags. In the case of Celite® Grade 545, the bulk bags contain 22kgs (50lbs) of filter media. The same/similar filter aids are also available in smaller packaged sizes, which are respectively branded as being either AquaCel® or AquaPerl®.

Alternative cellulose type filter aids (as used in vacuum precoat filters) are not considered suitable for use within regenerative precoat pressure filters.

Celite® and Harborlite® are not just used for swimming pools. They are widely used in many other Industries that filter; wine, beer, vegetable oils, citric acid, sugar, oils, pharmaceuticals, and fruit juices. Notwithstanding the long-standing and wide industrial-use of these filter aids; the choice of filter media is largely considered as Client's choice.

## 4.2 Diatomaceous Earth Filter Aids

As noted within its Material Safety Data Sheet, the origin of the Celite® product is noted to be Plankton Marine Diatomite. Diatoms are the skeletal remains of single-celled marine plants. When mined and processed, Diatomite (or Diatomaceous Earth) is a soft powdery mineral that broadly resembles ground chalk. Diatomaceous Earth is an inert mineral that is distinguished by having a variety of highly porous and quite different shapes that are predominately silica. When suspended in water and deposited onto a filter candle, individual will particles mass together to form a rigid, but highly porous filter cake that will provide unique process efficiency.

Celite® Grade 545 is rated by the Food & Drug Administration (USA) to be Generally Recognized As Safe. Apart from its GRAS rating, the Celite® product is compliant with the Food Chemical Codex monograph. Due to its flux calcined manufacturing process (with temperatures between 900ºC and 1100ºC) Celite® is also certified to be free of Dioxins (TCDD). The Celite product is widely used and supported by a successful service history spanning more than eighty years.

## 4.3 Perlite Filter Aids

Harborlite® (and its domestic equivalent, AquaPerl®) is widely considered as an acceptable alternative to Diatomaceous Earth. Being Perlite (amorphous alumina silicate) Harborlite® and AquaPerl® do not contain any crystalline silica. Based on available information, these filter aids are not classified as hazardous, according to criteria of NOHSC (National Occupation Health & Safety Commission). Similarly, these filter aids are not classified as Dangerous Goods, according to criteria of the Australian Dangerous Goods Code (ADG Code). According to the media supplier, AquaPerl® is also the only Perlite that is currently NSF Certified for swimming pools.

Harborlite® and AquaPerl® is half the weight of Diatomaceous Earth, making it easier to lift and carry. Despite a significant difference in product density, the same media volume is used as for Diatomaceous Earth. Ignoring any perceptions of being a healthier filter aid, Harborlite® and AquaPerl® are capable of providing high solids retention and high oil absorption. The substantially lower density of Perlite can also assist precoating, backwashing and regeneration cycles.

## 4.4 General Notes

Regardless of the particular filter aid being used, reference should be made to relevant Material Safety Data Sheets. Personnel Protective Equipment (PPE) and Engineering Controls are common requirements. The installing Contractor is required to provide the new Pool Owner/Operator with effective training and Instructions on all aspects associated with the safe operation of the filter, including the use and the application of the selected filter

aid. Refer to **Section 7.1** for additional information.

Waste filter media can be readily handled in is moist state and subject to local regulations it is suitable for landfill. Whilst used filter aid is chemically inert and non-hazardous, it may have different characteristics based on the contaminants that it has collected. Refer to your media supplier for recommendation on all safety and OH & S Issues relating to media use and disposal. In its moist state, any perceived risks associated with the inhalation of fine dust, are non-existent.

When the prescribed amount of filter media is added to your Atlas® filter, it bridges over the small openings of the cloth-covered filter elements to form a thin and even coating over the outside of the filter elements. Subject to the media dose rate, the wetted coating is nominally 3mm thick. The resulting filter cake forms a microscopic sieve, which is far finer than the filter cloth could ever provide by itself. It is important to understand that the replaceable filter media does all the work; whereas the cloth covered filter elements are simply designed to support the replaceable filter media. The filter media also protects the cloth covering from being prematurely clogged with minerals and solids.

As the Precoat filter process does its job of collecting pollutants, collected matter will progressively block the filter cake. Atlas® filters are not conventional static-cake type filters. They incorporate a unique (non mechanical) regeneration cycle that optimises the use of a replaceable filter media. Regeneration occurs automatically, without the need for any sophisticated and expensive mechanical bumping device. Each time the filter cycle is interrupted, the trapped dirt and filter media will automatically settle to the bottom of the filter tank. When the filter is re-started, the incoming water flow will automatically intermix and redistribute the filter media back on to the filter candles. This restores the porosity of the filter cake and maximizes the return of clean filtered water. When regeneration is no longer effective, backwashing is required.

# 5.0 FILTER INSTALLATION

## 5.1 Filter Installation

Your Atlas filter should be installed and commissioned by an accredited Contractor. Subject to the extent of the Supply Contract, the face plumbing and the backwash valving may or may not be supplied with your filter. To be consistent with other plant piping, many Contractors prefer to supply and install the face plumbing that is required for an Atlas® filter. As indicated in **Figure 8** alternative plumbing arrangements are possible.

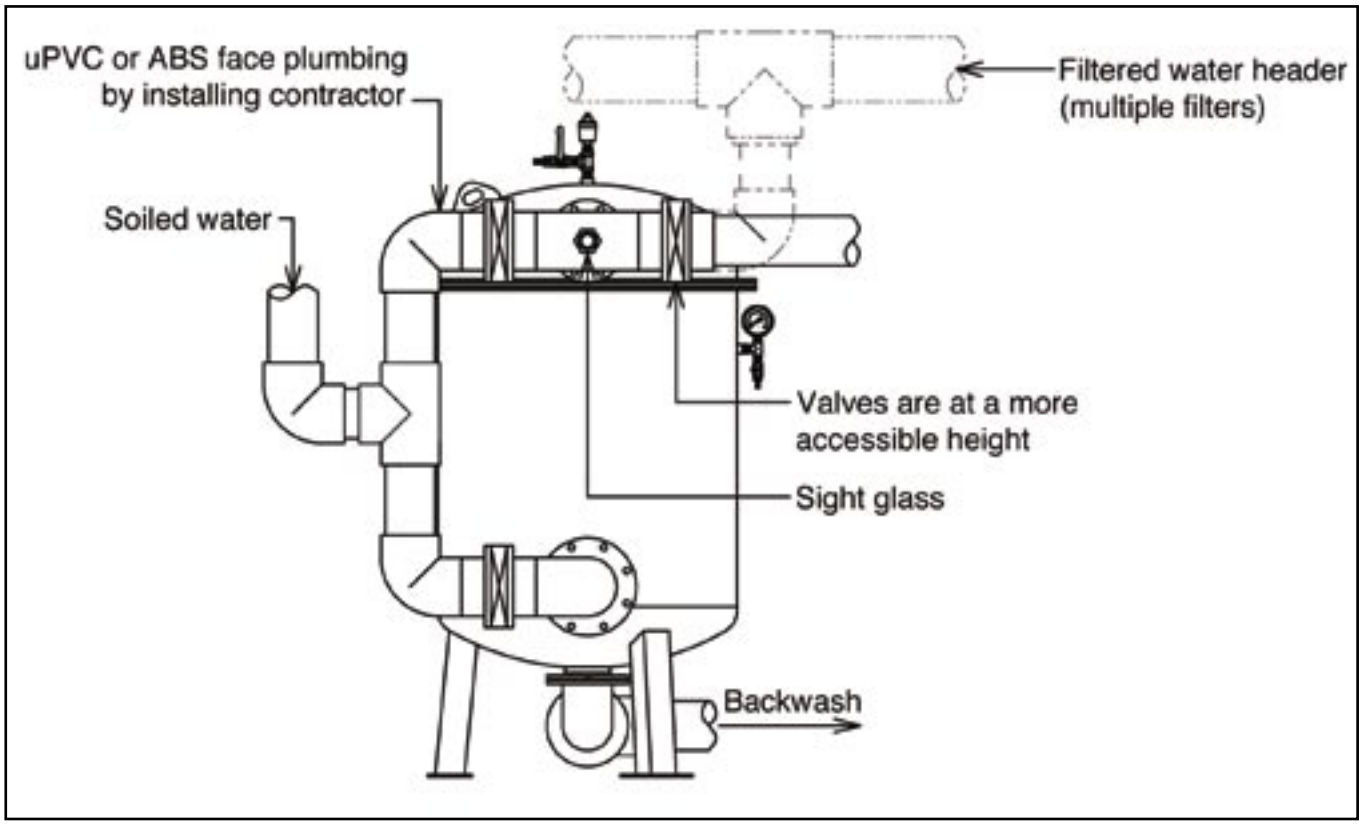
Control valves manufactured from engineering plastic are generally recommended. Whilst manual lever operated valves are considered satisfactory for line sizes up to dn150 (6”) diameter, gear operated valves are recommended for valves having a diameter of dn200 (8”) or greater. If valves cannot be located within easily accessible locations, automatic valve actuators are recommended.

Before starting work, spend some time to familiarize yourself with the product and its connections. This knowledge should be interpolated with the system design and the project’s requirements. The time that you spend now, should be considered as an investment that will return benefits in obtaining predictable results in the shortest possible time. Refer to **Figure 9** for key product features and fitments.

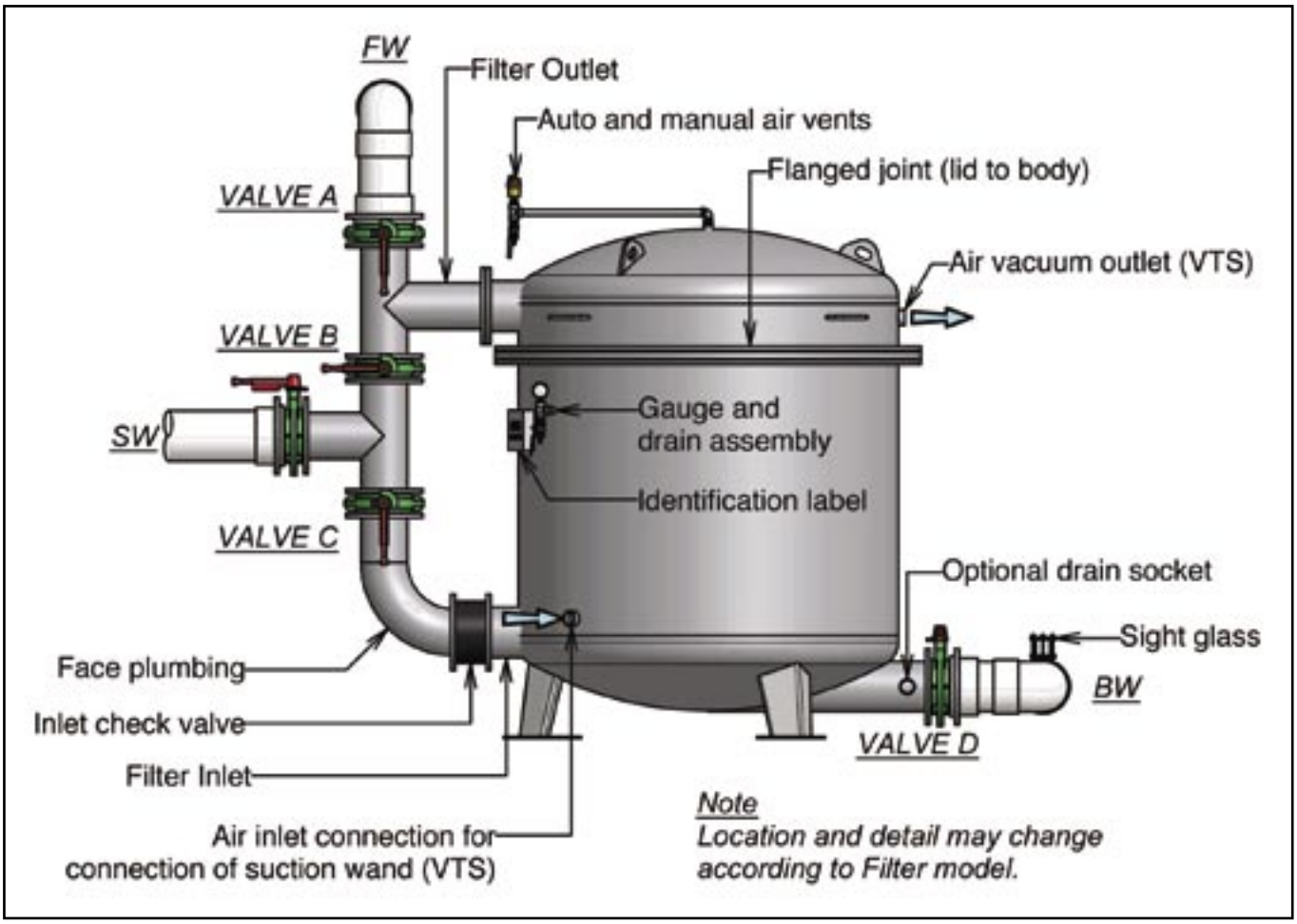
Note that the connection to the filter’s inlet (located on the side of the filter body) must incorporate a check valve. On many Models, this flanged connection is larger than the stated line size. This enables the use of an oversized (low-loss) check valve that is customarily the next line size up. For further details, refer to sales outline drawings for your particular filter Model. The primary purpose of this check valve is to prevent the backflow of filter media. The use of a check valve (in the connection to the filter) obviates the need for a check valve on the pump’s discharge. Do not use two (2) check valves in the soiled water line feeding to the filter. This will create unnecessary head loss, without achieving any purpose.

Your project may be satisfied with the use of one single filter model, or a given number of filter modules that are arranged in parallel to act as one system. Many Consultants & Designers prefer to specify the use of two (2) filter

## Figure 8: Alternate Face Plumbing Arrangement




## Figure 9: Key Product Features & Fitments



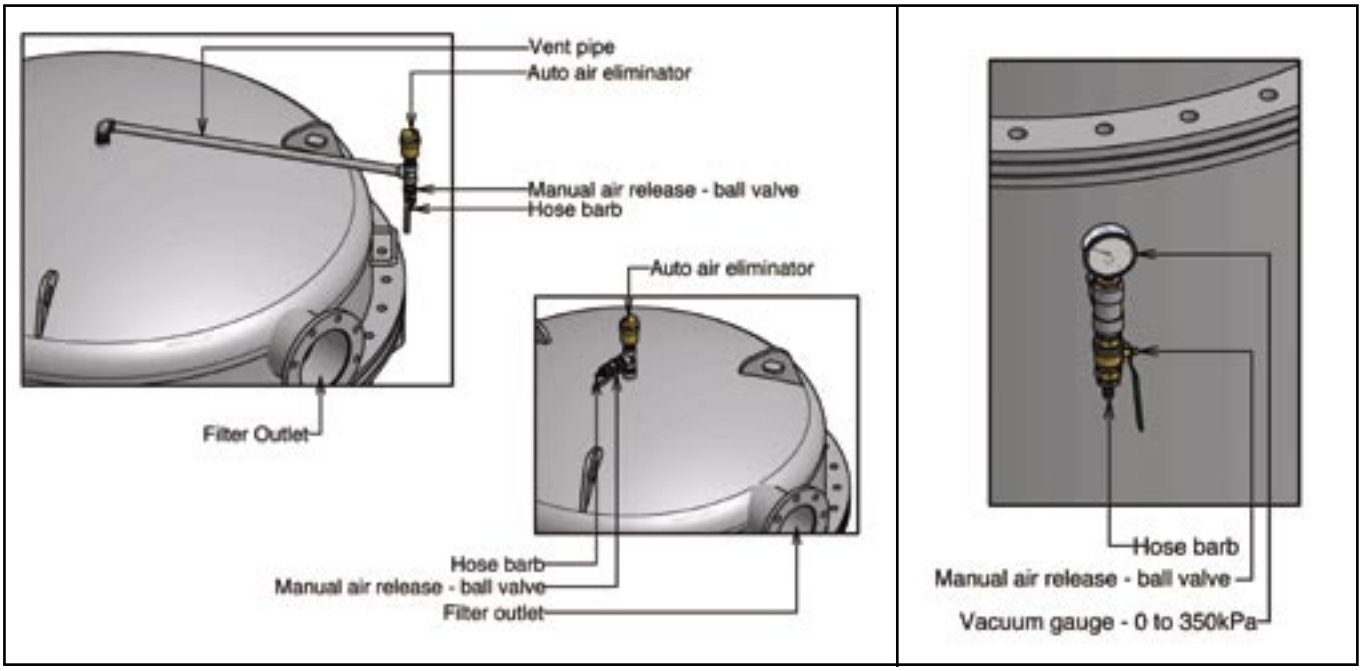
vessels in preference to using one (1) larger filter. Half-duty filter selections do provide the benefit that one filter can be serviced, whilst the other remains on-line. Refer to **Figure 4** for typical details of a two-tank filter system.

The installation of your Atlas® filter will require connection from the recirculating pump to the filter's face plumbing. The filter's face plumbing is subsequently connected to the filter inlet (on the side of the filter body) and the filter outlet located on the filter's lid. This latter connection must be flanged (or equal) to permit removal of the filter lid for future servicing. The final backwash connection is independent to the primary face plumbing and it is to be installed to allow the filter to be drained by gravity. If the backwash tank is not located below the filter slab, the filter's drain socket should be valved and plumbed to a suitable floor waste that will permit drainage of the filter.

The backwash piping is required to incorporate a sight glass that enables visual examination of the washwater during a backwash process. If the backwash tank is not located below the filter's floor slab, the filter vessel should be drained into a suitably sized floor waste or similar.

The filter installation is completed with the assembly of a pressure gauge, air vents, and various small-bore connections. Refer to **Figure 10** & **Figure 11** for further details.

## Figure 10 & 11: Air Vent & Filter Gauge Sub Assemblies




Your installation will typically include the supply and installation of diagnostic gauges, vents at high points, drains at low points, pipe supports, brackets, signage, and pipe labelling.

## 5.2 Vacuum Transfer System (Precoating Method)

The single stage air blower described in **Section 2.4**, is designed to create the sufficient vacuum to educt/draw the dry filter aid direct from its supply carton into the Atlas® filter. As indicated in the earlier **Figure 4** (and in **Figure 12** next page), the air blower is to be arranged with a high capacity air filter, screened vacuum relief vent, drain valve, and plant piping.

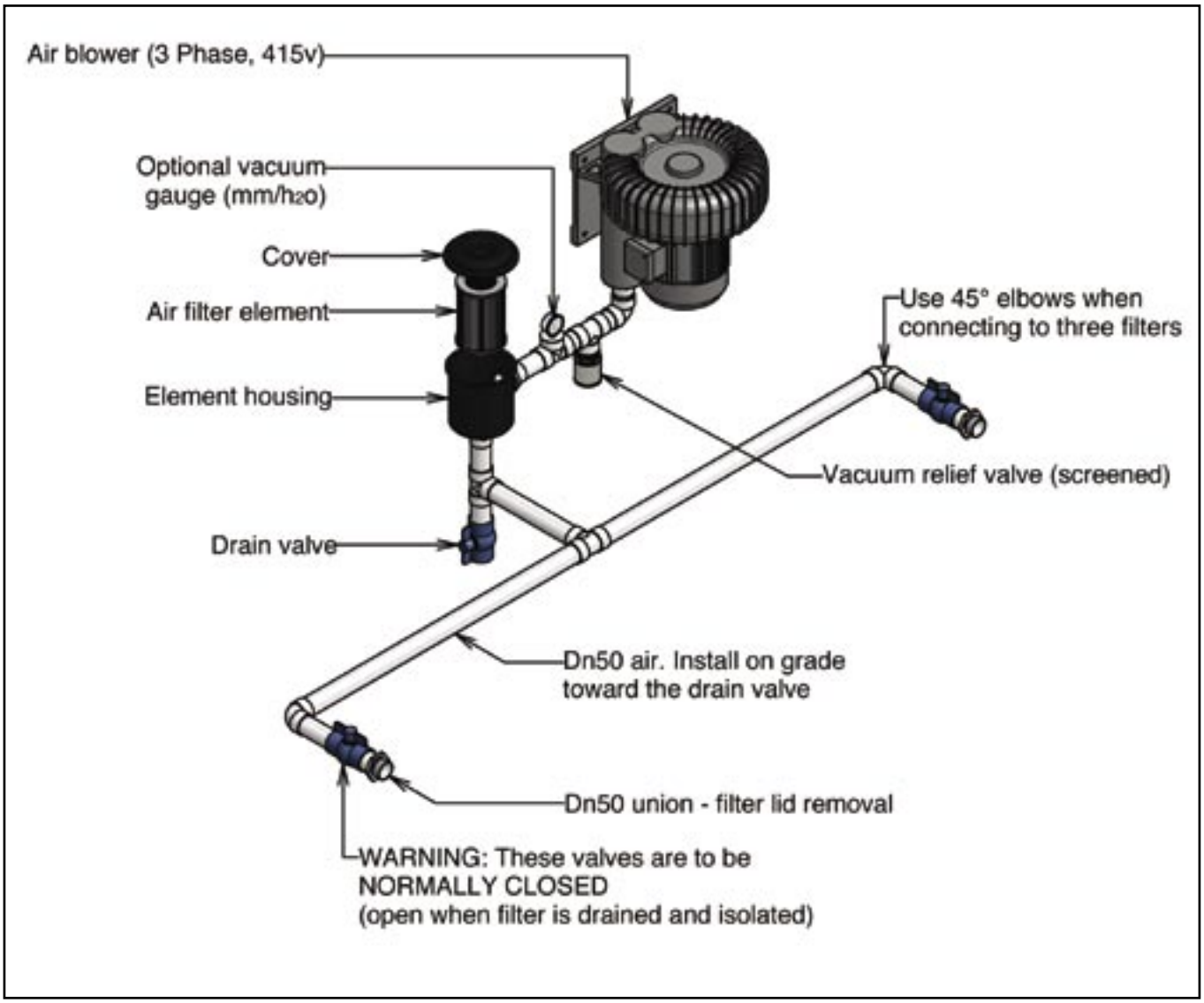
The air blower requires a weatherproof installation with adequate ventilation that is free of any corrosive or explosive vapours. The Blower must be protected from overload and over-current using a thermal overload device (magnetic phase protection) that is set no higher than the maximum amperage, as stated on the motor's nameplate. The adjustable vacuum relief valve (supplied with the blower) must also be correctly set to prevent the blower from operating beyond its maximum negative pressure.

The blower's connection to a three phase electrical supply must be carried out in accordance with the wiring diagram provided on the back of the terminal block cover. Electrical connections must be made by State qualified persons in strict accordance with AS3000, local Codes, and Ordinances. The three-phase power connection shall incorporate a weatherproof rotary ON/OFF switch that is conveniently located for the operation of the air blower.

**WARNING**
During the initial installation, foreign objects must be prevented from entering the air blower. Upon start up, any such objects will be suddenly and violently ejected from the blower's compression outlet. Flying objects of this type would have the potential to inflict serious personal injury.

**CAUTION**
Small particles & foreign objects will also have potential to block the impellor & they must be prevented from entering the blower's air intake. Do not start or test the blower, until the air filter is fitted & the screen on the vacuum relief valve is fixed in place.

## Figure 12: Typical Vacuum Transfer System (for two filter installation)




Before commencing any installation work, read the motor's nameplate carefully, and double-check your supply of an appropriate voltage and frequency. An incorrect power supply can cause the motor to burn out. Whilst an incorrect power supply will compromise the blower's performance and it could also result in a violent mechanical

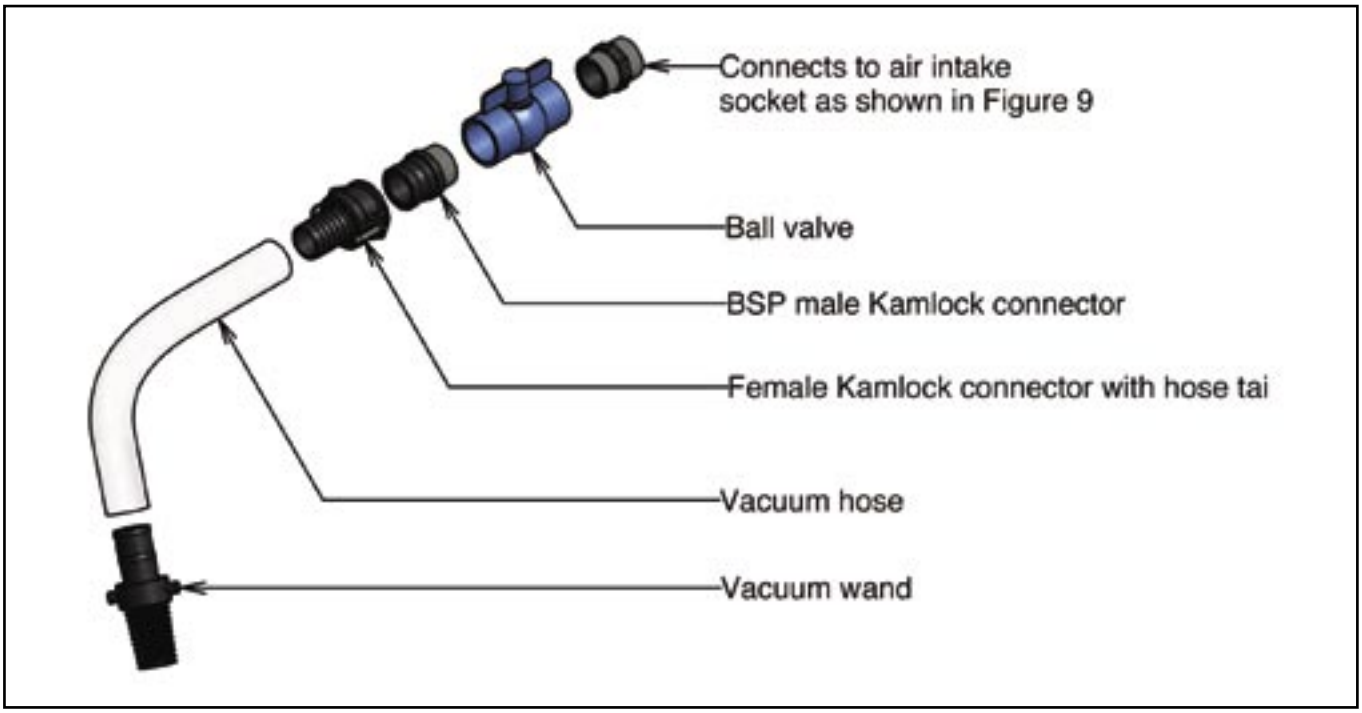
failure that could cause personal injury.

The air blower's body has a tapped hole to accept an M8 eyebolt. Use appropriate lifting equipment to raise and temporarily support the blower, whilst wall-mounting it with the inlet and outlet ports facing downwards. Use appropriate sized mechanical fasteners with vibration resistant components. Do not remove the protective plugs that seal the inlet and the outlet port, until ready to plumb the suction line that connects the blower to the filter(s).

The suction piping shown in **Figure 12** is to be fabricated from dn50, minimum Class 12 uPVC pressure piping. Note that a union is required within the dn50 suction pipework to facilitate future service and removal of the filter Lid. Providing that your Atlas® filters are arranged in close proximity, a single air blower could be used for up to three (3) PCT200 filters. In this case, located the Air Blower as close as possible to the filters and use two 45° elbows in lieu of a single 90° elbow. For multiple installations (with filters larger than PCT200) a single blower should be used for no more than two filters. A dedicated air blower is required when using a PCT800 filter.

When the installation works are completed, check the "direction of rotation" according to the arrow marking found on the blower's body. Also check that a vacuum has been created at the connection for the suction wand/hose. Refer to **Figure 13** showing a typical suction wand.

## Figure 13: Typical Suction Wand




When satisfied that the installation is correct, mount the "Operator Caution Label" in a prominent location to remind the Operator to close all isolation valves (associated with the Vacuum Transfer System) before re-starting the system for the next filter run.

**CAUTION**
Failure to close the air valves (after using a Vacuum Transfer System) is considered an operational error that can result in water damage to your Air Blower, which is not covered by any Warranty.

# 6.0 OPERATING PROCEDURES

## 6.1 Stopping & Starting the Filter Plant

Whilst a filter plant is generally designed to be operated 24-hours per day, there are occasions when it is necessary to stop the plant for routine maintenance, valve changeovers, and or regeneration. When stopping and starting a pump, it is important to follow the pump manufacturer's instructions. Incorrect procedures can result in excessive and unnecessary surge and or water hammer, which could result in damage that is not necessarily covered by any manufacturer's warranty.

The correct procedure to shut down or start up a pump requires that the Operator slowly closes or opens the Flow Control Valve found on the pump's discharge. Do not electrically turn-off a recirculating pump, without first closing the pump's flow control valve. In installations, where soft-start or VSD are deployed, the pump motor will automatically ramp up or down when starting or stopping the pump. This method of operation significantly reduces the risk of surge and water hammer and the need to use the flow control valve that is to be installed on the pump discharge. As a general rule, open and close all valves gradually and slowly.

Do not run any pump electrically for more than one minute with the flow control valve fully closed. This is usually ample time to start or stop a pump from a remote control station or switch. Failure to observe this requirement could cause over-heating and possible damage to the pump seals. Equipment damage of this type may not be covered by product warranty due to a lack of incoming water and subsequent over-heating.

Before starting a recirculating pump, double-check that all isolating valves are fully open. Also check the status of filter's valving to ensure that the start-up water has an open path, albeit in either a filter or a backwash mode. Never start a filter system, when both of the outlet valves (ie. Valves A & D) are closed. Also make sure that the Pre-Pump Strainer (which acts as a priming chamber) is fully primed (full with water) and that the strainer's lid is secure & vacuum-tight.

When below pool water level, you can verify that the strainer is primed, by simply opening the air vent found on top of the strainer. Providing that the isolation valve upstream of the strainer is open, water will in this case flow freely from the vent to confirm that the strainer is primed. When above operating water level, you will need to prime the prepump strainer by removing its Lid and filling it with water. On no account should a prepump strainer be connected to a mains water supply.

When starting a pump and operating its flow control valve (on the pump's discharge) carefully monitor all pressure gauges found in the immediate area. A higher than normal pressure will usually indicate an abnormality, which should be investigated before proceeding. If any difficulty is encountered (or suspected), simply close the flow control valve and shut down the pump. This will provide the opportunity and the time to review the start-up conditions and to correct any inadvertent errors.

If the plant is located above the pool's operating water level, open the manual air vent found on the filter's lid and electrically start the recirculating pump. Slowly open the flow control valve mounted on the pump discharge and monitor both vacuum and pressure gauge pressures. Close the filter's manual air vent when water is noted to flow freely from the vent. Trim the flow control valve to a notch plate setting that has been established during the commissioning process. This notch plate setting is required to enable the Pool Operator to re-set the plant at its design flow.

If a plant shutdown is required, the main recirculating pump(s) should be shutdown in the above manner as generally described above. Before shutting down the main recirculating pump(s), it is recommended that all downstream (flow-dependant) equipment, such as pool heating and chemical dosing plant be manually shutdown and isolated.

Until such time that the Pool Operator is entirely comfortable and confident in stopping and starting the plant, it is recommended that such work be undertaken by two (2) Operators, with each party double-checking each others work. Whilst this level cross checking may seem to be a cautious approach, case history suggests that this requirement is warranted and it should apply in the first few months of operation or when any new plant Operator is appointed.

## 6.2 Pre-start Check List

It is quite common that considerable amounts of dirt and construction debris will remain in the pool after its initial construction. For this reason, when pool construction is complete, it is essential that the pool basin and its surrounding decks be thoroughly cleaned & washed prior to filling the pool. The same requirement applies equally to any soiled water collection gutters, suction sump, and or balance tank.

Completion of construction work should be deemed to include all tiling, grouting, sealing, painting, & or the fitting of deck equipment, etc., Failure to fully complete all construction and aquatic fit-out (prior to the intended plant start-up) has the potential to create unnecessary and significant services issues that are not covered by any product warranty. Whilst the removal of rubbish and the cleaning of construction work may be the responsibility of the Pool Builder, the Installing Contractor is ultimately responsible to provide a well-planned and systematic start-up that reduces the risk of equipment damage & unnecessary service costs.

On no account should any ammonia or phenol based compounds be used for cleaning purposes. If disinfection or chemical cleaning is warranted, a mild chlorine solution should be used. This should be followed by an extensive hose-down that dilutes the chlorine.

When first filling the pool, it is strongly recommended that the pool be over-filled. On a deck level pool, this means that the pool's balance tank should be completely filled, to just under the invert of the overflow line. In a skimmer or scum gutter type pool, over-filling requires raising the pool's water level to about 40mm above the intended operating level.

If the plant room is located below the pool's operating water level, all main isolation valves on both the soiled water (SW) and the filter water (FW) line should be fully closed, before filling the pool. As in earlier sections, if the pool plant is located above the pools operating water level, it will be necessary to "prime" the pump, by filling the pre-pump strainer with water.

When the pool is completely filled, it should be super-chlorinated (preferably using calcium hypochlorite) according to the instructions printed on the supply container. Check that pH and alkalinity are within acceptable levels. These parameters can be further adjusted after the system has been placed into operation. Actively broom the pool to disperse chemicals that are added to the pool and let the pool settle for at least 24 hours. When the pool water has become visibly clear (and the oxidized material has settled) vacuum clean the pool floor with a mobile vacuum-cleaning cart. Whilst it is recommended that this once-only construction dirt be vacuum cleaned direct to waste, cleaning carts incorporating a filter may be used.

In the majority of cases, the source water for your pool or spa will be from a potable mains water supply. Whilst other source water may be used, (eg. bore water, seawater, etc.,) it is essential that the quality of this alternative source water be properly considered. Special pre-treatment may be required to prevent pool staining and other filter problems. If in any doubt, talk to your Atlas® Contractor. Remember that minerals and metals that are contained within the source water will be quickly oxidized as a result of the chlorination process and they should be removed by vacuum cleaning at the earliest possible opportunity.

Whilst the above work is being undertaken, the Technician (responsible for the intended plant start-up) is required to systematically check and verify that all installation work within the plant room has been completed in accordance with the design and the Contract requirements. The use of formal Check Lists throughout this whole procedure is strongly recommended. Given that Atlas® filters cannot be operated without first adding the prescribed amount of filter aid, the Technician responsible for the plant start-up is required to critically check the extent and the completeness of all plant and its piping connections. If flushing or pressure testing any plant piping, the filter vessel should be first isolated by closing all relevant valves. The same requirement may apply to other items of manufactured pool plant.

The pre-start work also includes a systematic check that confirms that gutter screens, strainer baskets, vents, fittings, and gauges are correctly installed. The technician is also required to check that sufficient pool water is available for the intended start-up. Similarly, the backwash detention tank and the wastewater disposal pump must be operational, prior to starting the plant.

Isolation valves for any associated plant (such as pool heating, chemical dosing plant, etc.,) are to be fully closed during the initial start-up process. Associated plant and equipment should be progressively brought on line, in accordance with that manufacturer's Instructions, after starting the main filter plant.

## 6.3 Vacuum Transfer of Filter Media into the Filter Vessel

1. Double check that ALL pre-start requisites have been duly satisfied & that the system is ready for precoating & plant start-up.

2. Verify the type, the amount, and the availability of the required filter aid. The media charge for the particular filter model is stated on the filter's identification label. Where possible, plan the required media charge to use the full contents of the supply container. When using Celite® Grade 545 or AquaCel®, the media dose rate may vary between 0.55kg/m2 to 0.75kg/m2. When using Harborlite® and AquaPerl® reduce these dose rates by 50%. Do not reduce or exceed the dose rate limits.

3. If the project has multiple filters, isolate all filters, other than the one that is intended for precoating. Isolating a filter can be simply undertaken by closing all valves. With installations have multiple filters, progressively bring each filter on-line (one at a time) in accordance with these Instructions

4. Open the filter's drain valve (and or its Backwash Valve - Valve D) to confirm that the filter intended for precoating is empty. If you have followed previous instructions, this should be the case. If the filter contains any water, open the filter's air vent and let the vessel drain, before proceeding to the next step. Having established that the filter vessel is empty, close all filter valves and vents.

5. Connect the suction wand/hose assembly to the air inlet (as shown in Figure 4). The location of this air inlet may vary according to the filter model being used. Open the isolation valve on the air inlet. The fact that water does not flow through the connected suction wand is further confirmation that the vessel is drained and it is ready for the transfer of filter aid.

6. Open the dn50 air outlet valve and the dn50 drain valve. Both of these valves are located within the suction pipework that connects the Atlas® filter to the wall mounted Air Blower.

7. Bring the filter aid's supply container in reach of the suction wand. For project's requiring the use of 22kg bags, deliver the required number of bags on a small platform truck or trolley. Whilst this precoating method is primarily dust free, use the PPE (Personal Protective Equipment) recommended within the relevant MSDS (Material Safety Data Sheets). Typically, the use of PPE would refer to goggles, gloves, & facemask/respirator. Carefully open the supply carton and slit the inner plastic bag/liner.

8. Start the air blower and check its current draw (amperage) whilst slowly closing the dn50 drain valve. Test and adjust the vacuum relief valve, as found necessary. Whilst the dn50 drain valve should normally be fully closed, it can remain partially open, if excessive current draw is encountered. The maximum negative (suction) pressure should also be checked using a gauge, calibrated in mm/H2O. After making any required adjustments, confirm that there is a negative pressure at the end of the suction hose.

9. Insert the suction wand into the supply container and evacuate the media into the filter vessel. There is no need to plunge the suction wand deeply or heavily into the supply container. Proceed carefully and avoid the generation of dust and or spillage. Take care that the suction wand does not bottom out and seal off on the supply container, creating a full vacuum. If this were to inadvertently occur, the vacuum relief valve installed upstream of the Blower would be expected to open. Excessive suction force can be regulated and reduced by partially opening the drain valve.

10. Vacuum up any spills. Close and seal the empty/used supply container(s) and dispose of all packaging at the earliest possible opportunity. Disconnect the suction wand and store it for future use. If not using the full contents of the supply container, re-seal and store the remaining media for future use. Apply all sensible industrial hygiene and housekeeping practices. Wash hands after handling dry filter media.

11. Close both of the isolation valves that are associated with the vacuum transfer system.



**NOTE**
This is an important & critical step that should be crosschecked. Failure to close these valves could result in water damage to the Blower, which is not covered by Warranty. Ensure that the Operator Warning Label is prominently displayed & include this Topic within any Operator Training.

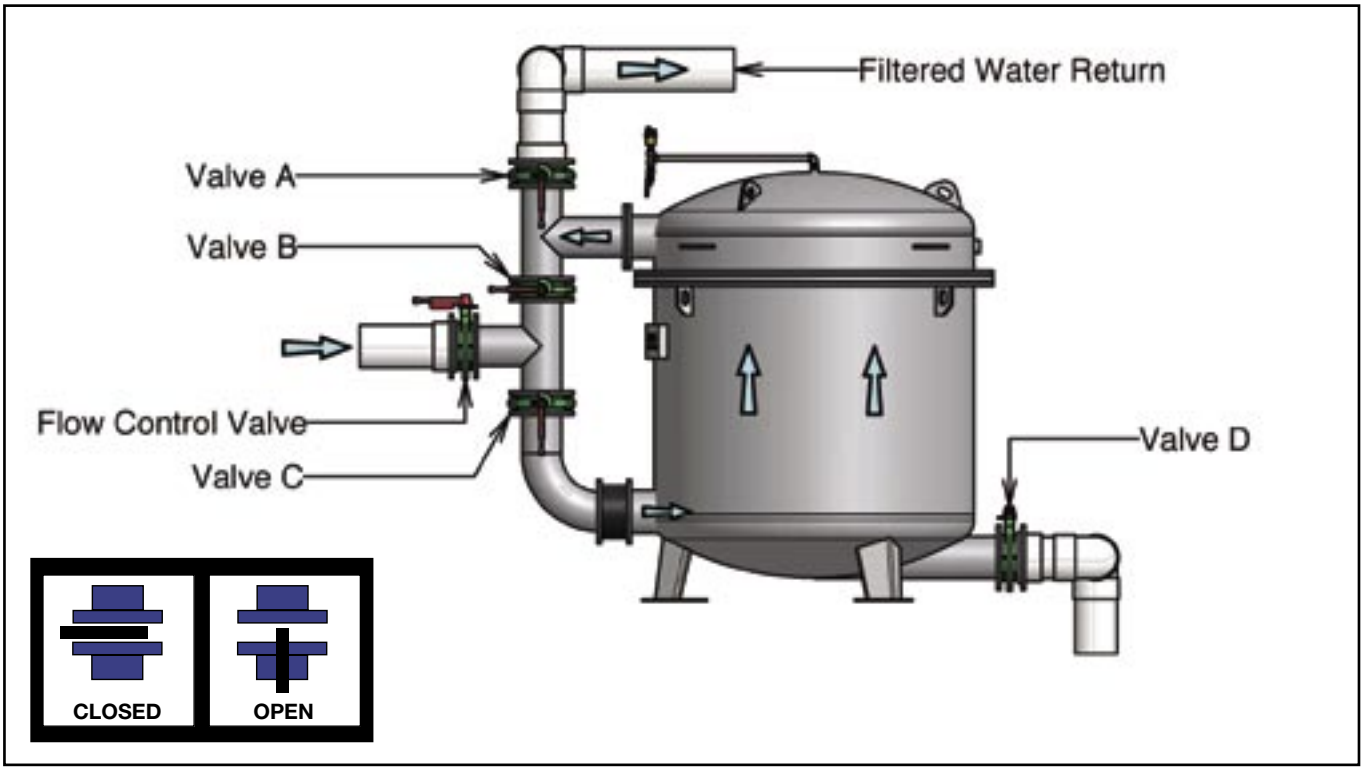
Use the above precoating procedure after all future and subsequent backwash cleaning cycles. Filter aid must be added before resuming the next filter cycle.

## 6.4 Initial & Subsequent Plant Start-Up (When using a Vacuum Transfer System)

This procedure follows two previous steps, whereby the pre-start requirements have been satisfied and the correct amount of filter aid has been transferred into the filter. With a vacuum transfer system, it is preferable that the filter vessel be top-filled. This will tend to release any dry filter aid that has coated the filter candles. In cases where top filling is not practical (as in many installations above OWL), the subsequent operations (and any future regeneration) will be sufficient to establish an effective filter cake.

When the filter plant is installed below water level, top filling can be easily achieved, without the operation of the recirculating pump. Simply open up all main isolation valves, open the pump's flow control valve, open the filter's manual air vent, close valves C & D, open Valves B & A. When water is noted to flow from the manual air vent, this will confirm that the filter vessel is primed and ready for start-up. Close the manual air vent when water is noted to flow freely from the vent and set the filter valves in the normal filter mode **(Figure 14)** with Valves A & C fully open, and Valves B & D are fully closed.

### Figure 14: Valve Settings for Normal "Filter" Operation




When the filter plant is installed above water level, top filling cannot be easily provided. In this case, open the manual air relief valve found at the top of the vessel and set the filter valves in the normal filter mode (**Figure 14**) with Valves A & C fully open, and Valves B & D are fully closed.

If applicable, open the isolating valve before the pre-pump strainer and start the pump in accordance with the pump manufacturer's instructions, i.e., start the pump with the flow control valve on the pump's discharge fully closed. Gradually open the flow control and note air being expelled from the vessel. Also, note that the filter gauge registers a start-up pressure. If your plant is above water level, close the manual air vent, when water is noted to be flowing freely.

The filter's initial start-up pressure will be commonly be somewhere between 30 and 70kpa. Higher start-up pressures should be immediately investigated; check for inadvertently closed valves; review the pump's selection; refer to **Section 9** for Problem Solving.

The filter has now been successfully started & given its previous precoating, it has begun filtering. The filter's flow can now be adjusted and commissioned to suit the Contract requirements. Do not operate at a greater than

intended flow. Once the system flow has been properly commissioned, note the filter's pressure gauge reading and record it to be the filter's "clean start-up pressure". Progressively bring any associated plant on-line in accordance with the specific manufacturer's Instructions. Note the final clean start-up pressure and record it in the Operators Log Book.

If multiple filters are arranged in a filter bank, progressively bring the remaining filters on-line in accordance with the above Instructions.

## 6.5 Regeneration

The opportunity for extended filter cycles is provided by the patented design of Atlas precoat filters. The Pool Operator can do regeneration manually. Alternatively, it can be programmed into your Pool Control Board to occur automatically. In this latter case, the recirculating pump should be fitted with "soft starters" or Variable Speed Drive. To ensure a soft and permeable filter cake, regeneration should be conducted on a daily basis.

When automatic regeneration is provided, the flow through individual filters will automatically stop for a programmed duration of one to four hours. This "quiet" shutdown period is usually programmed during times of low or non-use either at the beginning or at the end of the day. Apart from these planned interruptions, the filter plant should operate twenty-four hours per day.

The controls that provide automatic regeneration will commonly include interlocks that will effectively shut down all related plant that is flow dependant e.g., heaters, chemical dosing, and any plant that provides advance oxidation. In cases where multiple filters are used, this may or may not be necessary.

During a regeneration (shutdown) period, the filter media and the trapped filtrate will settle to the bottom of the filter tank. When the recirculation pump is re-started, the filter media will be re-distributed back onto the filter candles. This lowers the filter's operating pressure and provides extended filter cycles.

When the start-up pressure (after periodic regeneration) remains unchanged (i.e., it remains the same as it was the day before) the filter should be backwashed and new filter media should be added.

## 6.6 Backwashing

Backwashing an Atlas® Filter is required, when regeneration of the filter media is no longer effective. This will be evident by either a rise in pressure gauge readings or a general decline in the system flow.



**WARNING**
Throughout this & other similar procedures, do not attempt to change valve settings, whilst water is flowing through the system.

The backwash procedure for your Atlas® filter is as follows: -

1. Check that there is an adequate supply of water for a full and effective backwash. Subject to the pool type, the source water for backwashing will come from either, the pool, or a balance tank/suction tank.

2. Check that sufficient capacity available within the Backwash Detention Tank to accept the filter's washwater requirements. **Table 1** confirms the typical washwater consumption for specific filter models.

3. Stop the pump according to the manufacturer's instructions (i.e., gradually close the pump's flow control valve, before shutting down the pump, electrically).

4. Isolate any flow dependant equipment that is installed downstream of the filter. In a multiple tank installation (where other filters could remain on-line) this may or may not be necessary.

5. Open Valve D (or the filter's drain valve) to allow the filter to drain to waste. Subject to the method used, it may take several minutes to drain-down the filter. Whilst a drain down of the filter is not mandatory, it will

enhance the effectiveness of the backwash procedures.

6. Set the filter's valves for an "upper" backwash as shown in **Figure 15** - Valves A & C should be closed, whilst Valves B and D should be open.

7. Start the pump and allow it to run for about sixty seconds. Stop the pump.

8. Re-set the valves for a "lower" backwash as shown in **Figure 16** - Valves A & B should be open, whilst Valves C & D should be closed. Start the pump and run for at least thirty seconds. This operation will flush out the bottom of the filter. Stop the pump.

9. Reset the valves for an "upper" backwash as shown in **Figure 15** - Valves A & C should be closed, whilst Valves B and D should be open. Start the pump and run it for about thirty seconds.

10. Backwashing has now concluded and you can stop the pump.

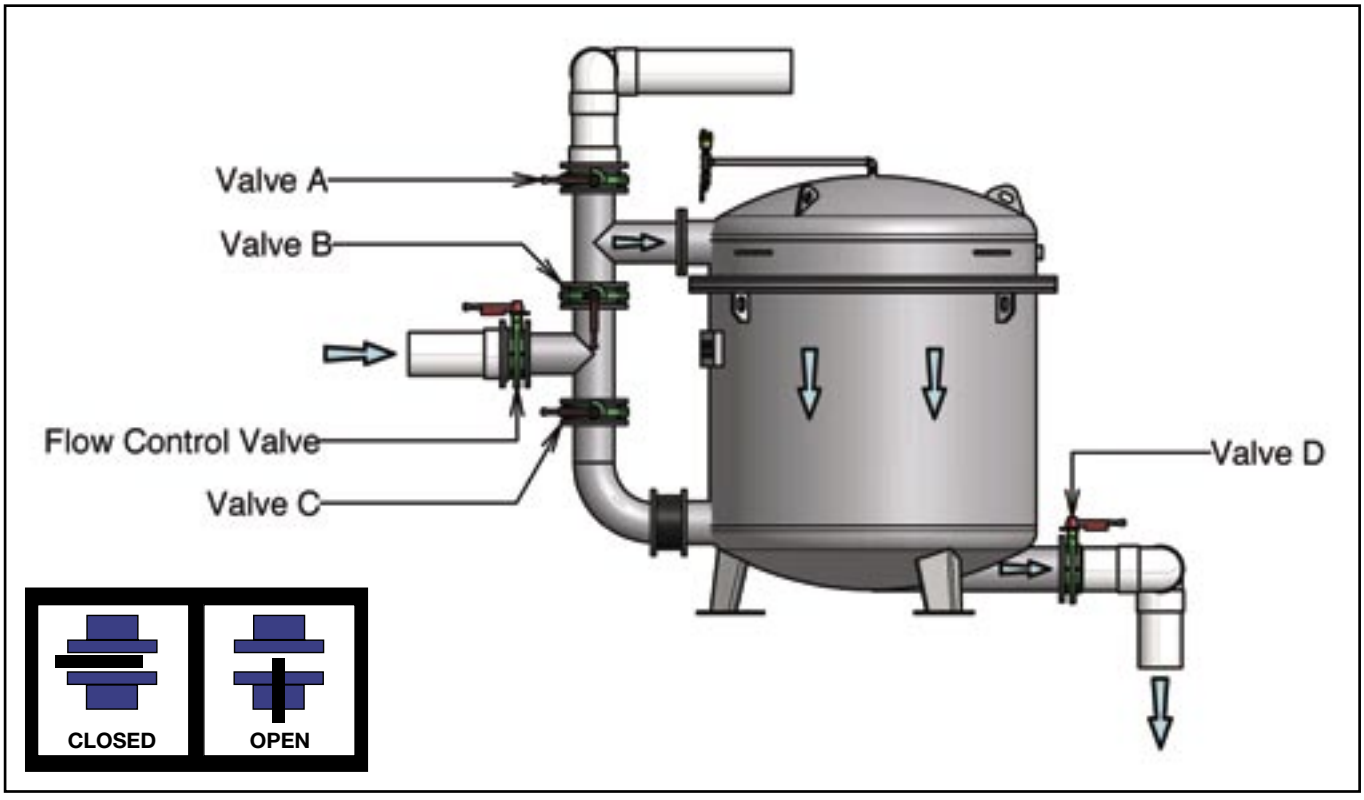
11. After backwashing proceed to precoat filter in one of two ways:
    - If using a Vacuum Transfer System, close all valves and vents and proceed to precoat the filter as described within **Section 6.3**. Re-start the plant as in **Section 6.4**.

    - If using pre-mixed slurry (from either a precoat pot or solution tank) set the filter's valves in the normal filter cycle (with valves A & C open and valves B & D closed). Start the recirculating pump in accordance with the pump manufacturer's Instruction. If above water level, open the manual air release valve located on top of the filters.

Open the outlet valve on the precoat pot, to allow the pre-mixed slurry to be educted into the filter. Maintain sufficient water within the precoat pot or solution tank. When all the slurry has been educted into the filter, close the outlet valve on the precoat pot. During this operation it is advisable that any sample water line feeding to the water chemistry's measuring probes, be closing whilst drawing the slurry from the precoat pot/solution tank.

Refer to **Figure 15** & **Figure 16** for the valve settings required to provide Upper & Lower Backwashing.

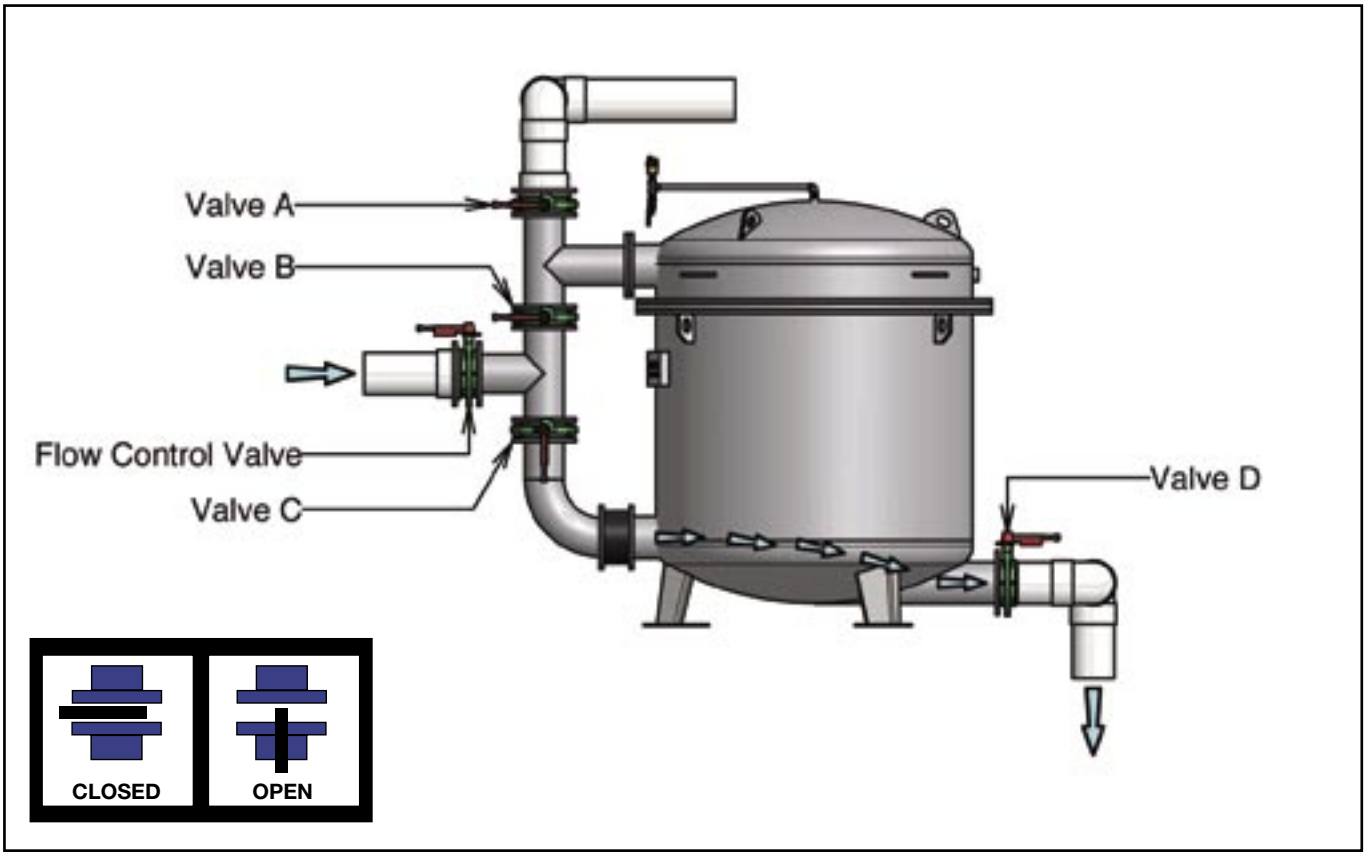
## Figure 15: Valve Settings for Upper Backwash



**NOTE**

When these instructions say, “stop the pump” an experienced Technician may achieve the same/similar result by simply closing the flow control valve, before doing a valve changeover. This method does not provide any time for deliberation, and you need to be confident and very familiar with all valve settings and positions, before using this method. For Plant Operators generally, when these Instructions say, “stop the pump” it is best that you stop the pump. Given that the backwashing of an Atlas® filter is a comparatively infrequent task; it is best to work through any operational steps slowly & methodically. Do not on any account attempt a valve changeover with water flowing through the system.

## Figure 16: Valve Settings for Lower Backwash




Subject to specific operating conditions, it may be necessary to repeat a complete backwashing procedure before reverting to a filter cycle. When operating at the faster filter rate of 5m3/hr/m2, the filter cake may tend to become a little more compressed and more difficult to remove. Given the very low wash water consumption of Atlas filters, do not be overly concerned about repeating a backwash process or backwashing for longer durations. If anything, this will only enhance the performance of the next filter cycle.

The installing contractor is required to commission the filter plant and to provide suitable plant settings that will assist the Pool Operator in conducting future backwashes using the correct water flow. Verification of the correct backwash flow is best achieved volumetrically, according to a rise of water level within the Backwash Detention Tank. For example, if the internal plan dimensions of the backwash tank were 2.25m x 2.25m this would produce a surface area of 5m2. If in one minute, the water level in the BW tank rose by 500mm, this would mean that flow going into the BW tank was 42 l/sec (ie., 5m2 x .5m = 2.5m3 x 1000 = 2,500 litres per minute or 42 l/sec). As indicated in **Table 1**, a flow of 42 l/sec is the required backwash flow for a PCT300 filter.

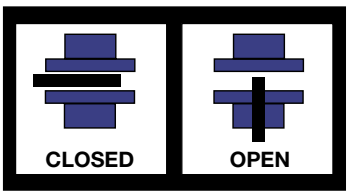
## 6.7 Valve Position Summary

Whilst the written descriptions provided for various operating cycles may seem complex and daunting, this is not the case. They are seemingly complex, due to the need to adequately describe the individual steps that are required for certainty. Once you are familiar with the product and the installation, you will appreciate the simplicity of your Atlas® filter.

Atlas® filters are no more difficult to operate than other forms of filtration, albeit that you need to replace the filter media (filter aid) after backwashing.

### Table 2: Required Valve Settings

| Operating Cycle | Valve Number & Status | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Normal Filtering | Open | Close | Open | Close |
| Top Backwash | Close | Open | Close | Open |
| Bottom Backwash | Close | Close | Open | Open |
| Vacuum Transfer | Close | Close | Close | Close |




## 6.8 Start-Up Tests & Fault Finding

After the initial start-up (as described in **Section 6.3**) the installing Contractor is required to systematically check and commission the filter system. This is best done by using a set of formal Checklists that will confirm and record the results of all start-up tests. Typically, your installing contractor will verify the operation of all filter cycles and the effectiveness of all piping joints, electrical interlocks, flow switches, vents, vacuum breakers, pressure gauges etc.,

As described in **Section 6.6** the installing contractor will also establish settings that will enable the Pool Operator to backwash the installed filters at the required flow rate. Similar settings shall also be established for the normal filter cycle. Given the variable flow characteristics of the recirculating pump, a change in impeller diameter could be required. As a general rule, the need for any excessive adjustment/closure of the flow control valve should be avoided.

In some installations (substantially above water level), it is possible the outlet flow from the filter will exceed its inlet flow. This will usually evident by low filter pressures and the operation/opening of vacuum breakers installed on the outlet side of the filter. In these rare cases, an orifice plate should be installed in the filtered water return line to slow down the outlet flow and increase the system pressures such that the plant always remains and operates at positive pressures.

**CAUTION**
Equipment damage can occur, if the plant is incorrectly subject to vacuum.

If start-up or commissioning difficulties are encountered, refer to **Section 9 - Problem Solving**. Most start-up issues can be resolved with simple reason. If assistance is however required, it best to collate all relevant information prior to making your enquiry.

# 7.0 OPERATIONAL ISSUES FOR THE POOL OPERATOR

## 7.1 The Safe Use of Filter Aids

Whilst the frequency of precoating and the amount of filter aid required for an Atlas® filter is comparatively small and seemingly inconsequential, the responsibility to maintain a safe workplace primarily rests with the Owner/ Pool Operator. The Owner/Pool Operator should consider the information that is available within relevant Material Safety Data Sheets and should apply those precautions that are necessary for the project. With the assistance of the installing Contractor, the Owner/Pool Operator should instruct employees and apply suitable procedures for a safe work environment.

Regardless of the particular filter aid being used, simple & common sense procedures applying to the use of filter aid are as follows:

- Minimize dust generation and its accumulation.
- Avoid breathing dust & avoid contact with eyes - use the recommended PPE.
- Seal broken or half used bags at the earliest possible opportunity.
- Use full supply containers, wherever possible.
- Follow all MSDS and label warnings when handling & disposing empty containers.
- Vacuum clean dust with equipment fitted with a suitable filter.
- Use a dust suppressant (such as water) if sweeping was necessary.

With the correct operating procedures, dry filter aids can be safely used with confidence. Any perceived difficulty that may be encountered with the use of a dry filter aid should be considered relative to the many unique benefits that are provided with this form of filtration. Apart from the obvious public health benefits (associated with two-micron detention) this form of filtration operates with minimal washwater consumption. It is not uncommonly that issues associated with the use of a dry filter aid can be badly and unfairly reported. These Instructions simply ask that you follow Instruction and use common sense procedures. Do not be concerned with mis-information, the performance of Atlas® filters are a matter of record.

## 7.2 Total Pool Care

Whilst precoat pressure filters will remove copious quantities of bacteria, it should be understood that filtration does not purify pool water. An oxidizing agent such as chlorine is an essential requirement to convert pool impurities into a filterable form. An oxidizing agent is also required to establish & maintain acceptable chlorine residuals within the pool basin.

## 7.3 Chemical Flocculants

The flocculants and coagulants that are commonly used for other (less efficient) forms of filtration are not necessary (and nor should they ever be used) with Atlas® Regenerative Precoat Pressure Filters. Given that coagulants are not required with Atlas® filter, you can expect generally lower requirement for all chemicals, particularly those normally required for the control pH and alkalinity.

The incorrect use of chemical flocculants will tend to “bind” and plug the Atlas® cloth covered candles. Correction of this condition will require extensive chemical cleaning or replacement of the filter socks. Refer lto **Section 8.4**.

## Table 3: Water Chemistry Guidelines

| Chemical Parameter | Range | To Raise | To Lower |
|---|---|---|---|
| pH | 7.2 to 7.6 | Add soda ash (sodium carbonate) | Add Hydrochloric (muriatic) acid or carbon dioxide gas where reserve alkalinity is less than 120mg/l |
| Total Alkalinity | 80 to 200ppm | Add sodium bicarbonate | Add muriatic acid |
| Chlorine | 1.0 to 1.5ppm | Add chlorine | No action – will dissipate |
| Chlorine - stabilized | 3.0 to 4.0ppm | Add chlorine | No action – will dissipate |
| Stabilizer (Cyanuric acid) | 20 to 30mg/l | Add stabilizer | Dilute – partially drain & refill |
| TDS | max 3,000 mg/l or not more than 1,000mg/l above the mains water supply | Not applicable | Dilute – partially drain & refill |



**TABLE 3 NOTE:**
The above information is provided for reference only. Specific state-based Health Departments commonly provide the requirements for pool chemistry, bacteriological criteria, water balance, etc.,

## 7.4 Cycle Times

During the initial start-up period, your Atlas® filter may require frequent cleaning. Do not be overly concerned; this is attributed to the very fine particle selectivity of the filtering process and the often poor quality of some mains water supplies. Once the required water clarity has been established (and the pool is chemically balanced) the filter cycles will lengthen quite dramatically. For the same reasons, you can also expect a far higher rate of clarification that will produce unique and sparkling water clarity.

Filter run/cycle times are dependant upon a variable bather loads. The Pool Operator should monitor pressure gauge readings (under actual load) conditions with a view of developing a program for regular and effective backwashing. Regeneration of the filter should also be provided on a daily basis. When operated in accordance with Instructions, cycle times of four to eight weeks are not uncommon. In some cases, even longer filter run times can be provided.

## 7.5 Mineral Content

It is important to keep in mind that the mineral content within your pool will tend to rise, due to the addition of various pool chemicals. This is exacerbated by unavoidable water losses that are due to bather carryout, backwash losses and evaporation. If the concentration of minerals is allowed to become too high, this could arguably complicate the pool's chemical control. It could also have a tendency to "bind" or "plug" the filter fabric. This would also have the potential to result in shorter than normal filter cycles. In outdoor applications, windbreaks & pool covers should be used to limit the evaporation, which concentrates mineral content within the pool.

Your principal operating objective should be to use the fewest chemicals in the lowest possible concentration that is consistent with maintaining healthy water. Don't forget that the unique process efficiency of your Atlas® filter will physically remove microscopic solids and bacteria. This will tend to reduce your pool's demand for oxidizing chemicals, whereby any chemicals added for oxidation, can be better used for the primarily purpose of disinfection. This tends to simplify pool water chemistry, whereby the level of combined chlorines is often noted to

be far lower when using Atlas® filters.

As a general rule, avoid any heavy handed over-dosing of chemicals. This is not in the bather's best interest and it should be avoided. It is better to make a number of judicial and marginal corrections according to accurate & frequent test kit readings.

The Pool Operator should regularly monitor the progressive build-up of total dissolved solids. The natural increase of Total Dissolved Solids (TDS) can be managed with the addition of fresh mains water. In cases where TDS is difficult to control, a conductivity meter and a small solenoid bleed valve can be used as a simple means of maintaining better TDS control. TDS can also be managed and controlled using a small RO (Reverse Osmosis) plant. This however is a sophisticated and costly mechanism to control what is a comparatively minor and manageable consequence.

The technical argument for controlling a low TDS is usually based on the premise that "high" readings can interfere with the bactericidal activity of chlorine. In many regards, this is a gross over-simplification that should be considered, in terms of the overall treatment priorities. Given the ever-increasing cost of incoming mains water and the outgoing wastewaters, numerous benefits can be obtained by accurately monitoring the progressive build-up of Total Dissolved Solids. If pool water is to be dumped to lower TDS, this should be done in conjunction with an overall strategy that considers the best & most responsible use of water. The decision to dump water should always be made with the benefit of accurate conductivity readings, rather than estimates of TDS.

## 7.6 Rainwater Harvesting

Given their low washwater requirements, Atlas® filters are frequently used and specified as a strategic part of water conservation and water minimization programs. Such programs will often include rainwater harvesting. Subject to adequate controls being in place (to protect public health) the use of clean filtered rainwater can provide many obvious environmental benefits.

Rainwater collected from tanks can be safely used in swimming pools providing that it is introduced into the pool system at night, allowing sufficient time for effective treatment before bathers enter the pool the next day. Safe rainwater use for swimming pools is achievable in most situations, unless the rainwater is collected from roof structure that is located in a heavily polluted area, whereby particulate pollution from vehicles, aircraft, and or industrial activities could contaminate the rainwater. Similarly, roof structures that have been constructed from hazardous materials (such as lead or preservative-treated timber) are also unsuitable for any rainwater harvesting and or beneficial re-use.

Effective first flush systems can minimise particulate and microbial pollution to acceptable levels. First flush systems will reduce contamination because the first few millilitres of rainwater (containing the highest concentration of pollutants) are not collected. Microbiological contamination of rainwater can also be adequately controlled with appropriate chlorination.

The use of rainwater has the benefit of having a low TDS and being comparatively soft water. Rainwater is also inherently low, in carbonates. In heavily polluted areas, the cost of pre-treatment could very clearly outweigh the potential benefits of rainwater harvesting, especially if a reliable and adequate water source is available.

## 7.7 Pool Operator's Typical Duties

Apart from filter backwashing and maintaining the pool water treatment plant, the following requirements are typical of the Pool Operator's normal, day-to-day requirements:

1. Vacuum clean pools to remove all sediment from the floor of the pool. This is customarily performed on a needs basis, outside normal operating hours.

2. Physically test the chemical composition of the pool water (in accordance with Test Kit instructions). Record all such results and make corrections/adjustments that are necessary to maintain appropriate water balance. The frequency of chemical tests will commonly be specified by the relevant State or Territory based Authority.

3. Check water temperature and adjust temperature set-point controls as deemed necessary. Do not operate pools at higher than necessary temperatures.

4. Check the status of all indicating lamps/lights provided on your Control Board. Investigate immediately and report any abnormalities & subsequent actions on a Maintenance Log sheets or similar.

5. Check supply of chemicals & re-order as necessary. Levels within chemical tanks should be recorded on the daily maintenance log sheets.

6. Monitor all vacuum and pressure gauge readings. Record all pressure readings on the daily maintenance log sheets.

7. Monitor free chlorine and pH readouts on all automatic water chemistry controllers and compare these results to the physical tests - record and report any major deviations. Periodic recalibration the chemical control probes will be required. Re-calibration of any probe should be recorded within the Operator's Log Book.

8. Check and clean strainer baskets arranged on the suction side of the recirculating pump(s). Vacuum gauges fitted on the pre-pump lint filters, indicate the resistance on the suction side of the pump. Any reading above -55 kPa should be promptly investigated.

9. Conduct a visual and audible check of all items of plant and equipment. Report any water leaks as soon as they first become apparent.

10. Check that all drains and floor wastes are clear and operable.

11. Routinely check the effectiveness of the wastewater pump-out system. Effective filtration is dependant upon regular and effective backwashing. This can only happen if the backwash pump-out system is maintained in peak operating condition.

12. With vacuum transfer systems, routinely check the air filter that is installed upstream of the air blower. Look for any signs of filter aid, which would usually indicate a fault with the seals or the filter socks inside the filter. Also look for evidence of water, which would confirm incorrect operation and possible water damage to the air blower.

13. Record "water meter" readings of the incoming mains water supply and the outgoing wastewater discharge line.

14. Where applicable use pool covers/blankets as per dedicated Instructions.

15. Routinely, check and clean gutter screens as required.

## 7.8 List of Things to Do & Don't Do



**DON'T DO THIS**

- Don't operate a pump without first understanding its intended function.
- Don't operate any item of plant without first reading the manufacturer's instructions.
- Don't run a pump without checking that all suction valves are fully open.
- Never use the valves installed on the suction side of the pump for flow throttling.
- Don't start a pump without first checking that there is an adequate water supply.
- Don't run a pump longer than one minute with the pump discharge valve fully closed.
- Don't change any equipment settings indiscriminately.
- Don't let untrained staff operate the plant and equipment.
- Don't use flocculants (PAC) with this form of filtration.

- Don’t use any unknown pool chemicals.
- Don’t use hybrid water treatments that promise to deliver magical results.
- Don’t operate the pools any warmer than they need to be.
- Don’t take short cuts; follow all Operating Procedures provided by your Installing Contractor.
- Don’t wash the pool surrounds into the pool gutters.

## MUST BE DONE

- Inspect the plant room vigorously each and every day.
- Before starting a pump, check the status of all downstream valves to confirm a possible path for the intended water flow.
- Share your knowledge and train others with the correct procedures.
- Read these Instructions & feel free to ask questions and request additional information.
- Maintain optimum water chemistry, at all times.
- Impose appropriate bather management in terms of bather numbers.
- Encourage swimmer hygiene practices & let patrons know why and what you are doing in this regard.
- Maintain strict vigilance & be prepared for incidents.
- Satisfy your obligations to Occupational Health & Safety.
- Backwash filters according to an established timetable and log all details.
- Check all gauge and flow readings on a DAILY basis.
- Have the pool water biologically tested on a regular basis.
- Test the incoming water quality; look for any abnormalities.
- Use Log Sheets to manage day-to-day activities & record meaningful information.
- Regularly check the performance of the backwash pump out system.
- Don’t attempt any valve changeovers (as required for a backwash process) whilst there is water flowing through the system.
- Use Personal Protective Equipment (PPE) when and where recommended.
- Use the flow control valve when starting or stopping a pump.
- Ensure that the ventilation to electrical motors is not blocked.
- Close all valves slowly and gradually.
- Look for water leaks, loose brackets, vibration issues, etc.,
- Manage the progressive build-up of TDS in according with treatment objectives & conductivity readings.
- Clean gutter screens & prepump strainers.
- Listen for noisy pumps & motors.
- Regularly check the effectiveness of all high-level vents.
- Ensure adequate an adequate stocks of chemicals and consumables.
- No matter how small the apparent problem; record its occurrence & inform relevant parties.

# 8.0 MAINTENANCE REQUIREMENTS

## 8.1 General Considerations & Definitions

No filter plant can be expected to operate reliably, unless all items of equipment are operated in accordance with instructions. Similarly, the reliability of your Atlas® filter plant is equally dependent upon the application of adequate & appropriate maintenance.

Maintenance is generally defined as being the work and the minor repairs that are necessary to maintain individual items of plant in a working condition, which is consistent with their expected service life. A good maintenance system relies heavily upon the routine inspections that are customarily provided by the Pool/Plant Operators. As part of their Quality Assurance, a Pool Owner will often engage the services of an independent Consultant or Pool Service Provider to conduct an external audit of their facility. Given the importance and the need for robust and effective maintenance, such services are recommended.

It is unusual for maintenance problems to arise quickly without any notice. More commonly than not, issues or problems will occur gradually, usually corresponding with use and or age. Such problems are also, usually heralded by telltale signs indicating an impeding problem and or the need for better service and or maintenance.

Fundamental maintenance requirements are as follows:

- Keep all work areas in a neat and orderly fashion.
- Follow a systematic plan for the execution of the daily operations.
- Routinely maintain the plant and its finishes.
- Establish a routine schedule, whereby individual work areas or plant rooms are vigorously inspected. If problems are discovered, take appropriate steps to report the issue so that it can be resolved or fixed.
- Maintain meaningful records on all major items of plant. Apart from logging any repairs, record any unusual incidents or faulty operating conditions.
- Observe all common sense safety measures - do not tamper with equipment unless suitably trained & qualified.
- At the end of each month review all log & test results and compile a summary of events.

Whilst the Installing Contractor is customarily responsible for the correction of apparent defects (during a specified Contract period), the Pool Operator is required to operate and maintain the plant in a safe and efficient condition.

Apart from maintaining accurate records, it is important to note that:

- The filter plant is operated in strict accordance with the instructions and or recommendations provided upon start-up. Such instructions are to be based on the manufacturer's literature & or the Operating & Maintenance Manual, provided by the Installing Contractor.
- Warranty (and or free service) does allow for any misuse, abuse, water damage, negligence, and or accident. The golden rule for successful plant operation is "If in any doubt, seek direction from your Supervisor".
- Pool water must be maintained and balanced in accordance with the Langelier Saturation Index. Similarly, chemical concentrations should be generally maintained in accordance with the recommendations provided by the relevant State or Territory Authorities.
- If a defect becomes apparent in the first twelve months of operation, its significance could vary quite substantially. Be this as it may, the Installer Contractor must be advised of the potential problem, when it first becomes apparent. This could affect or limit your access to product Warranty.

## 8.2 The Concept of Preventative Maintenance

For swimming pools that are required to operate reliably on a year round basis, most Pool Owners prefer to adopt a program of preventative maintenance. Under this arrangement, any part or item that starts to show signs of wear is automatically repaired or replaced. This work is normally undertaken during a yearly close down period, but with proper planning it can often be done periodically throughout the year at times that are covenant to the Operator.

Rather than respond to random breakdowns, preventative maintenance is undertaken prior to the product's failure. Items that cannot be readily inspected (eg. pump bearings, mechanical seals etc.,) should be replaced after a nominated number of running hours irrespective of their condition.

To manage an effective maintenance program, it is essential that all repairs and or replacements be accurately logged, so that over time, the service life of the component or product can be established under actual operating conditions. With an accurate and meaningful service history, parts or items of plant can be confidently reconditioned, repaired, or replaced, at times that are convenient to the Operator.

Whilst the Pool Operator may have the staff and the skill to undertake some routine maintenance, it is strongly recommended that all service and maintenance work be undertaken by an Authorized Service Company. Case history confirms that this is often the most cost effective and appropriate way to maintain you plant in peak operating condition.

## 8.3 Annual Maintenance

It is recommended that Atlas® filters be manually washed-out at the end of each swimming season. This is done by first backwashing and draining the filter vessel. Valves A, B, and C are commonly closed during this maintenance procedure. Subject to specific installation details, the backwash valve (Valve D) can usually remain open.

It is required that the persons planning to undertake this procedure be fully equipped and prepared for all possible eventualities. It is recommended that a formal Check List be prepared to identify the possible need for specific materials and spare parts. Such supplies could include a need for a Method Statement, work platform, platform ladder, fall-constraints, appropriate tools, lubricants, washing products, cleaning agents, and spare parts, not limited to filter socks, sock O rings, donut gaskets, body seals, M12 hex stainless steel nut and washers, etc.,

The filter's lid is removed by first removing the external and visible fasteners that secure the filter lid to the filter body. Whilst further service work is being undertaken, soak these lid-fasteners in a penetrant lubricant or rust inhibitor. These fasteners are zinc-coated high tensile steel & they may require future surface protection, particularly in damp or salty/seawater environs.

Other than small fibreglass filters, the filter's Lid is removed using overhead lifting equipment. When using a Vacuum Transfer System, disconnect the dn50 airline prior to lifting the Lid. The filter's (top) pressure plate, which clamps individual filter candles in place, is similarly removed using overhead lifting equipment. The M12 hexagonal nuts that clamp the pressure plate in position will be comparatively tight. Use an appropriately sized ring spanner or socket wrench to avoid potential damage to the nuts. Do not use a common shifting spanner for this work! Take care not to drop any tools, nuts or washers insider the filter.

Whilst other work proceeds, store all stainless steel nuts and washers and soak them in a dedicated penetrant type lubricant. Subject to the size of the filter being serviced, a work cage or safety constraint may be required when working on top of the filter. As a minimum requirement, it is strongly recommended that the person undertaking this annual service prepare a formal and approved Work Safety Method Statement, covering all possible risks associated with the required work procedure.

When lifting the Pressure Plate, use a synthetic sling in preference to the standard the metal hook that is often attached to the lifting chain. This will avoid future corrosion issues, due to the stainless steel pressure plate being contaminated with iron. Raise the pressure plate evenly and slowly to avoid damage to the M12 studs that are part of the lower & heavier Tube Plate. Take the same care when re-installing the pressure plate.

With the pressure plate removed, individual filter candles can be removed/lifted-out from the thicker & heavier Tube Plate. Individual filter elements are best placed in a mobile bin/platform trolley for transport to a suitable wash-down bay. This wash-down bay will customarily drain to the Backwash Detention Tank.

For most filter models, the supply of an eyebolt or a serviced monorail is an essential maintenance requirement. All mechanical lifting gear should be certified with an appropriate Safe Working Load (SWL). Similarly, persons using any mechanical handling equipment must be trained and authorised to operate any installed lifting equipment.

The service weight of key components and relevant filter Models are as follows:

## Table 4: Service Weights (Filter Lids, Pressure Plate & Tube Plate)

| FILTER MODEL | PCT 150 | PCT200 | PCT300 | PCT400 | PCT460 | PCT 600 | PCT800 |
|---|---|---|---|---|---|---|---|
| Tank Lid (kgs) | 65 | 65 | 135 | 165 | 185 | 245 | 340 |
| SS Pressure Plate (kgs) | 58 | 58 | 76 | 102 | 125 | 143 | 245 |
| SS Tube Plate (kgs) | 95 | 95 | 175 | 295 | 325 | 515 | 815 |



**TABLE 4 NOTE**
Whilst the above service weights represent current manufacturing details at the time of publication, such details may be subject to change - if in doubt, seek additional/specific information. The above are gross weights exclusive of any allowances and or safety margins.

As a minimum requirement, each filter candle should be hosed off with a strong blast of water. Angle the water blast to best remove residual filter aid and dirt. As refer to **Section 8.4** for details on soaking and chemical cleaning. Use this wash-down requirement as the first opportunity to check the integrity of the filter sock and its seams.

The filter vessel should be generally washed-out and each O-ring seal and cloth-covered candle should be inspected for any possible defects. In accordance with the general concept of preventative maintenance, O-ring seals and gaskets are best replaced during an annual service. Given the valuable service that these seals provide, they should be considered as being a comparatively low cost consumable. It is often a false economy to only replace, those O-rings that appear suspect or defective.

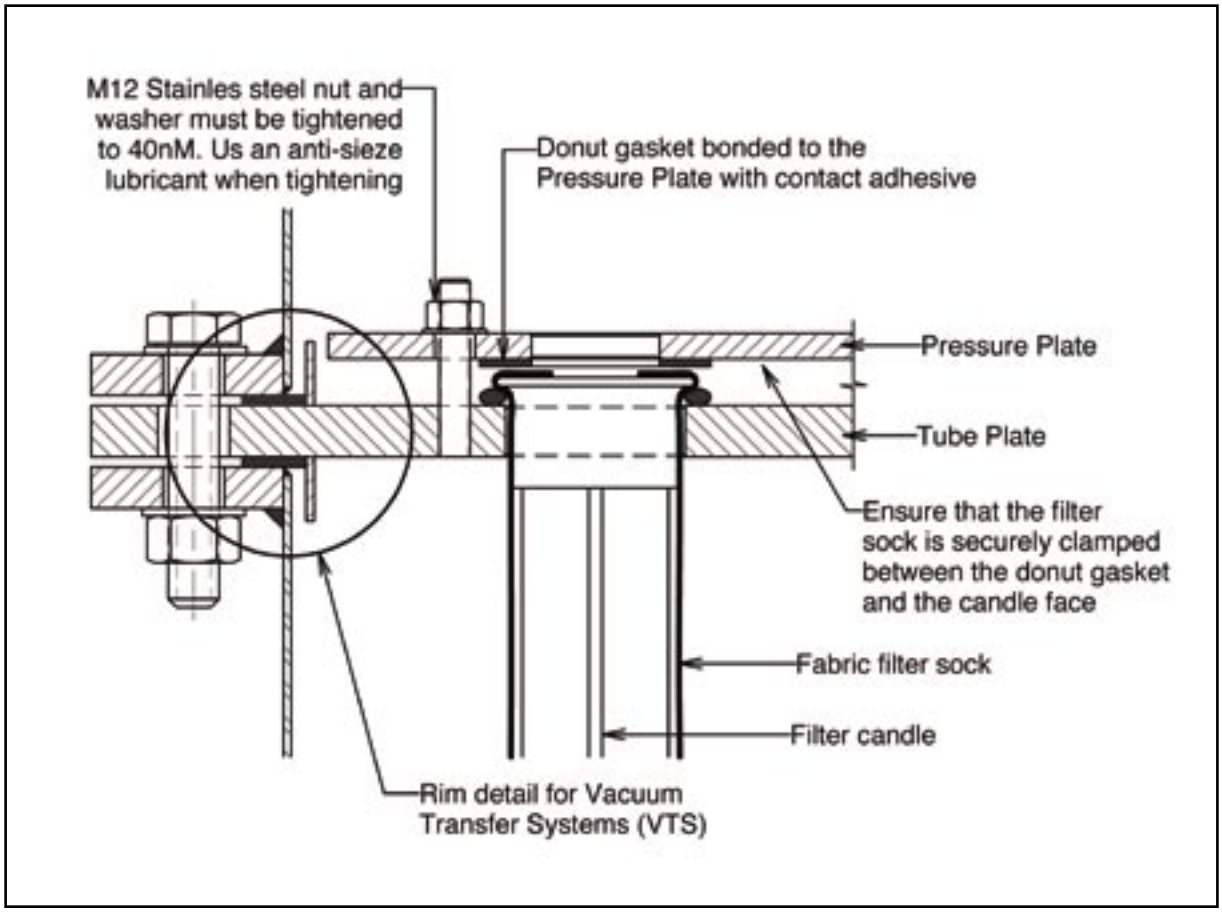
After twelve months of operation, it is not uncommon to discover a residual of filter media remaining inside the filter vessel. The extent of this residual is usually related to how well the filter has been operated & backwashed during the earlier season. If required, full access inside the filter can be obtained by removing the heavier “tube” plate. If removing at Tube Plate, visually inspect all inside surfaces of the filter vessel.

When re-fitting the filter candles, make sure that each cloth bag is pulled taught, leaving excess cloth to be securely clamped by the donut gasket, which is bonded to the underside of the Pressure Plate. Before lowering the Pressure Plate into position, inspect all of the M12 studs that project from the Tube Plate. Remove any foreign material and all dirt. Carefully lower the Pressure Plate into position to pick-up the M12 studs. Liberally apply a suitable stainless steel anti-seize lubricant to reduce the chance that the stainless steel fixings will “fire” or “marry”. When replacing the washers and nuts, take care with the thread start. If any unusual resistance is encountered, supply and fit a new hexagonal nut. If the M12 stud has been damaged, die-cut the existing thread using a suitable cutting compound.

Start fitting the washers and the M12 Hex Nuts to secure the Pressure Plate. Start from the inside of the plate and

work towards the outside of the plate. Tighten nuts with a torque wrench set to 40nM. The stud pattern on filters up to and including PCT200 is circular, whilst the stud pattern on PCT300 and above is linear. Refer to **Figure 18** for stud tightening sequences. Be prepared to repeat stud tightening until all studs are correctly tightened to 40nM.

## Figure 17: Clamping Of Pressure Plates




**CAUTION**
When replacing the top pressure plate, the M12 hexagonal nuts that secure the pressure plate, MUST be evenly tightened to a torque of 40Nm. Failure to satisfy this requirement will result in premature & unnecessary service.

When re-fitting the filter lid, refer to Instructions provided in **Section 8.5**. At the conclusion of the annual maintenance, wash down the filter and clean the plant room.

Installations that operated “seasonally” must be winterised, after completing the above maintenance. Winterising requires that the filter remain in a fully drained condition. Before sealing and isolating a filter (for the off-season) the vessel must be fully vented, so that the cloth filter elements can dry out. Do not shut down a filter plant at the end of the swimming season, without first draining and venting the filter as described. For installations that are operated year round, proceed to precoat and start-up the filters for the next operating cycle. Given the nature of the above work, it is strongly recommended that an Authorized Service Agent undertake annual service work.

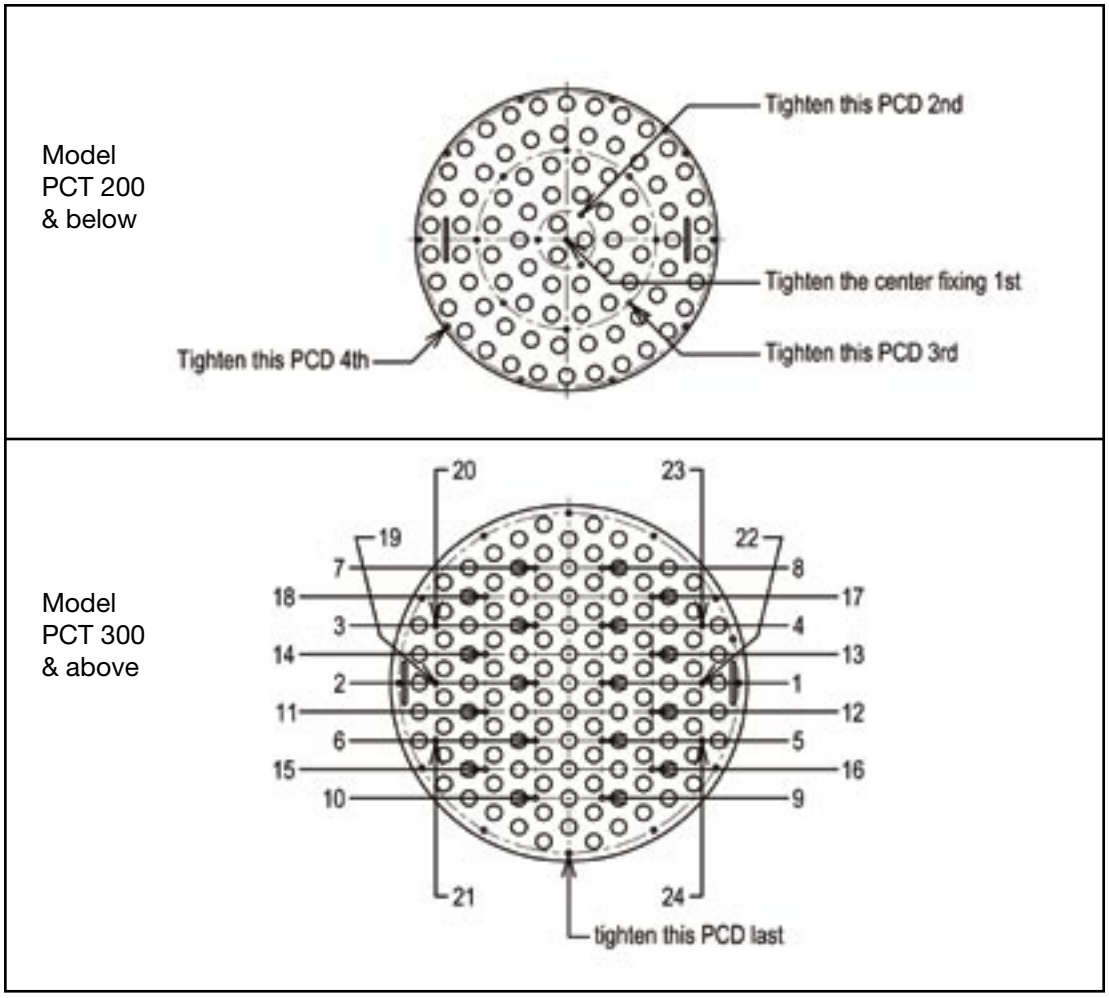
## 8.4 Filter Sock Maintenance & Replacement of Filter Socks

During the earlier sock washing process (described in **Section 8.3**) it is important to visual examine all filter socks. If any fraying of the sock is noted in the cuff area, this is usually an indication that the pressure plate might not

have been adequately tightened during a previous service.

To maintain the permeability of the filter fabric, filter socks may be soaked and washed in a warm (polyphosphate) detergent. This should be followed by a thorough rinsing/hose down. Proprietary cleaners (as commonly for pleated cartridge filters) may also be used to remove body oils and fats. These cleaners should be used in accordance with the instructions that are printed on the supply container.
Any mineral deposits (or accumulated scale) may be removed by chemically soaking the filter bags in a solution of one part muriatic acid to five parts water (or proprietary cleaner) in accordance with the package instructions. Protective clothing & suitable gloves are a mandatory requirement.

## Figure 18: Pressure Plate Tightening Sequences




Filter socks provide a very valuable and critical service, whereby their replacement is often warranted according to the service and the variable loading that they are subject to. High temperature operation (as with spa pools) will commonly require more frequent replacements, than filters that are operated at swimming pool temperatures. The cost of filter sock replacements should be tempered against the Atlas® cost savings and benefits that are provided in other areas, eg., lower washwater consumption, unique particle selectivity etc.,

Whilst specific service procedures are available for filter sock replacement, it should be noted that cloth bags should be pulled taught with excess cloth being clamped under the donut gasket that is bonded to the underside of the pressure plate. As noted elsewhere pressure plates must be tightened to 40Nm.

## 8.5 Filter Lid Tightening Procedure

When replacing an Atlas® filter Lid, note that that its relationship is “matched” to the filter body. The orientation of the filter’s outlet and the air connection (when using a Vacuum Transfer System) will also provide confirmation of the correct Lid position. Always tighten the Lid fixings in a ‘’star pattern” around the filter as follows:

1. Starting from a point, tighten the first bolt, by one full turn. Move 180° around the filter, to the bolt on the same centreline, on the opposite side and tighten one turn only.

2. Move 90° around the filter and tighten the bolt one turn only. Move 180° around the filter to the bolt on the same centreline, on the opposite side and tighten the bolt one turn only.

3. Move to the bolt next to the first bolt tightened and tighten one turn only. Move 180° around the filter to the bolt on the same centreline, on the opposite side and tighten one turn only.

Continue with this pattern until all bolts have been tightened.

When complete, a final tightening will be required, as the first few bolts will have become loose. Tighten these bolts to approximately hand tight, plus 1/4 to 1/3 of a turn only. Note that the bolts should only be a little more than hand tight when complete with a gap of only 3mm to 4mm between the mating flanges.

As the filter pressures increase, do not be overly concerned if some leaks are observed. These will usually take-up with subsequent filter/backwash cycles. If not, some further adjustments (1/4 of a turn only) may be required in areas only where these leaks occur.

The 6mm thick, neoprene extruded pinch seal gasket that is provided between the filter flanges and the tube plate should be replaced on a need basis. These seals are glued to one face with contact adhesive.

**CAUTION**
Do not over-tighten or use power tools when securing the filter’s lid. This has the potential to distort the filter flanges and damage the pinch seal gasket. Some initial leakage may be experienced, until the gaskets adjust to the required tightening.

## 8.6 Corrosion Issues

Some early Atlas® filters were supplied with Tube & Pressure Plates that were manufactured from coated carbon steel. More recent production has standardized on the use of stainless steel materials. Installations using coated carbon steel Tube or Pressure Plates are encouraged (at the appropriate time) to upgrade to Stainless Steel Plates.

Whilst product service history indicates that heavier Pressure Plates (manufactured from protected carbon steel) will provide a long and acceptable service life, the lighter Pressure Plates, which are subject to substantially more handling (& potentially more coating damage) are best replaced using Stainless Steel. The use of a Stainless Steel Pressure Plate, will commonly enable continued/ongoing use of a coated carbon steel Tube Plate.

Stainless steel is an excellent material that is widely used in both the water treatment and the swimming pool Industry. The corrosion resistance of stainless steel is attributed to a very thin and tenacious film of chromium oxide that forms naturally on its surface. In an oxidizing environment (such as in air or water) the chromium oxide layer will be automatically maintained and it will even repair itself, if damaged. Stainless Steel however, is not necessarily immune from all types and forms of corrosion.

The integrity of stainless steel can easily maintained with some simple common step measures. As in **Section 5.1** stainless steel filter shells are required to be earthed to protect it from corrosion due to stray electrical current. Similarly, if the filter is to be taken off-line for several months (during a winter-off season) make sure that you drain the filter. This will avoid issues associated with stagnant water & microbiological corrosion. In a similar manner avoid any contamination with carbon steel materials and tools. Contamination of this type can be usually be

resolved by local pickling or passivating the affected area.

If installed within a plant room that has poor and or substandard ventilation (or excessive chlorine vapours) surfacing staining of stainless steel is best avoided by applying a protective coating/paint. On no account should any chlorine-based cleaning agent be ever used to clean or wash any stainless steel surface. Similarly, do not use steel wool to remove any surface blemishes. If there is a need for any long-term mechanical cleaning, use a synthetic Scotch-Brite™ pad or equal. As described within **Section 2.6**, chemical dosing plant is to be electrically interlocked with the recirculating pump and all chemical injection is to occur downstream of the filter plant.

The most significant potential for any corrosion with your Atlas® filter is likely to be associated with internal crevices or places where the stainless steel material is deprived of oxygen or water flow/velocity. Examples of such areas are typically under rubber gaskets, under O-ring seals, or within threaded joints. Although the product design of your Atlas® filter attempts to minimize these potential areas, the use of seals and threaded joints cannot be totally eliminated.

The significance of any corrosion issue will vary according to water chemistry and specific operating conditions. The potential for corrosion will be higher, at higher water temperatures. If during the life of the product, any crevice or pitting corrosion is encountered (under a gasket or O ring), it is advisable to repair any local damage with polyester or epoxy filler, like Plastibond™ or similar.

## 8.7 Pressure Gauges & Vents

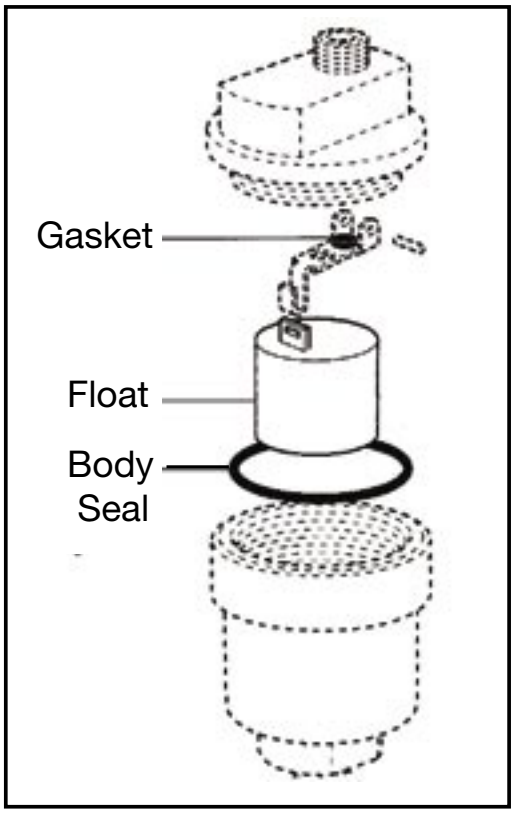
Pressure and vacuum gauges are important diagnostic tools that provide valuable information confirming the operation and the efficiency of your filter plant.

Do not dismiss a broken or defective gauge to be minor or unimportant. Ensure that all pressure and vacuum gauges maintained in an operable condition. If gauge readings appear unusual, test it in another location. If this test confirms that the suspect gauge is defective, replace it, as a matter of priority. Gauges are comparatively inexpensive and they are easy to install. When fitting a new gauge, make sure to use a spanner. Do not screw the gauge into position by gripping and turning the dial.

Manual and automatic air vent also provide a critical service and must maintained in an operable condition. Leakage from the automatic air vent (Spirax Sarco Model AE30 - ½" BSP) can usually be fixed with removal of foreign material/dirt or replacement of the sealing gasket.

Refer to **Figure 19**. If spare parts are required they can be obtained direct from Spirax Sarco.

**Figure 19: Spirax Air Vent**

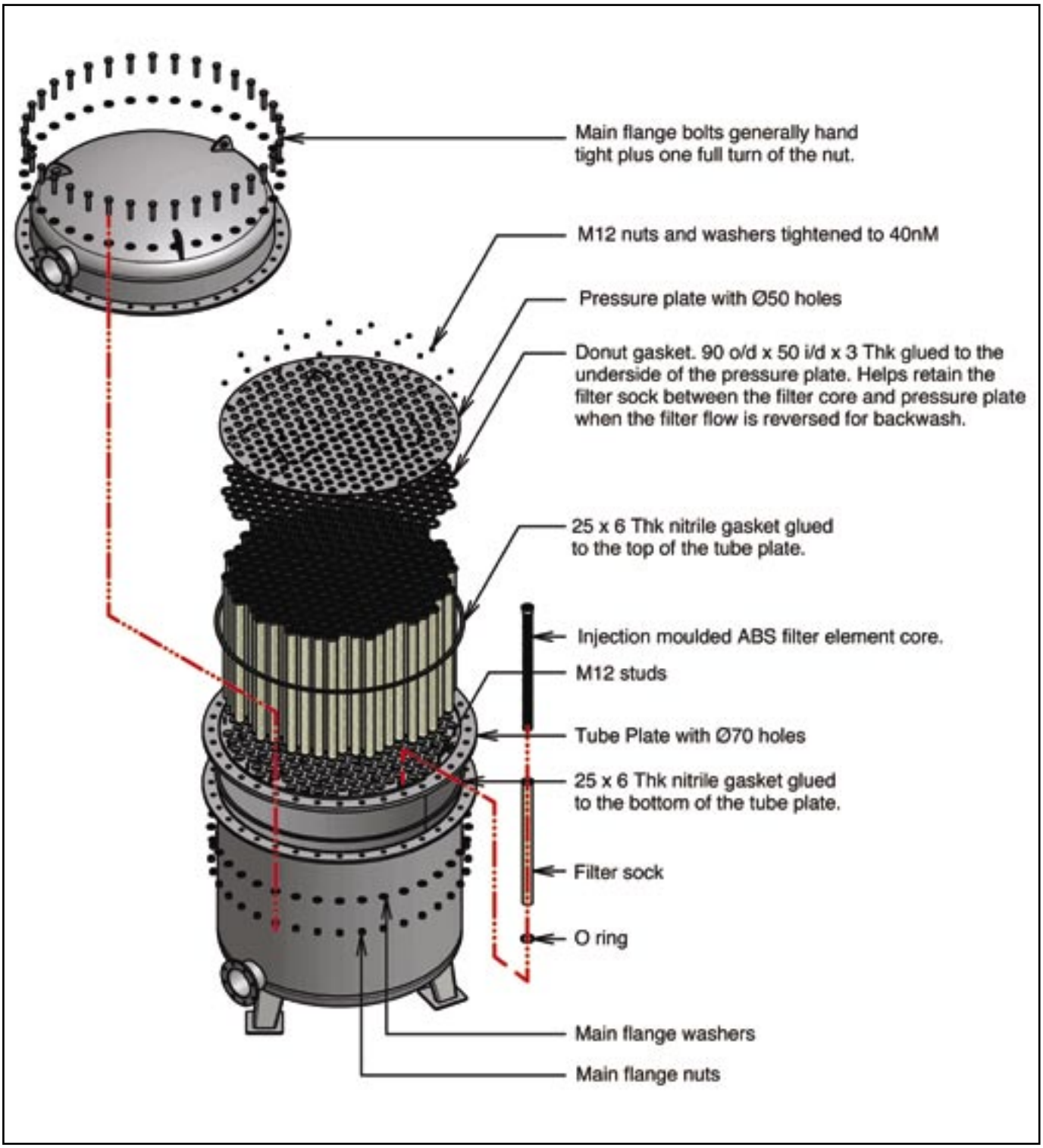



## 8.8 Spare Parts & Consumables

Throughout the product's life, various spare parts & consumables will be required. The service life of these parts and components will vary according to the conditions that they are required to process. How well the product is operated and maintained will also have an impact on likely service life.

Whilst a complete sock replacement is accepted as being a major service, it should be noted that new filter socks will restore your Atlas® filter back to its original purchased condition. Rather than use a policy of Repair Only On Failure (ROOF), it is strongly recommended that all filter socks be replaced as complete sets.

## Figure 20: Component Parts



As indicated in Table 5, the common spare parts required for various filter models are as follows:

## Table 5: Spare Parts According to Filter Model

| Filter Model | No Filter Candles | O-Rings & Donut Gasket | Pinch Seal Gasket (l/mtrs) |
|---|---|---|---|
| PCT65 | 37 (s) | 37 | 5.5 |
| PCT80 | 37 (s) | 37 | 4.5 |
| PCT100 | 37 | 37 | 4.5 |
| PCT135 | 55 | 55 | 6.5 |
| PCT150 | 82 (s) | 82 | 7.0 |
| PCT175 | 41 + 41 (s) | 82 | 7.0 |
| PCT200 | 75 + 7 (s) | 82 | 7.0 |
| PCT300 | 114 + 7 (s) | 121 | 8.0 |
| PCT400 | 163 | 163 | 9.5 |
| PCT460 | 187 | 187 | 10.0 |
| PCT600 | 241 | 241 | 11.0 |
| PCT800 | 321 | 321 | 14.0 |



**TABLE 5 NOTE**
Pinch seal gasket (for production post 2007) is supplied as 25 x 6mm thick and is designed for Vacuum Transfer Systems. The pinch seal gasket for earlier production is 12 x 6mm thick. Specify gasket width at the time of Order.

## 8.9 Maintenance Records

The foundation of any good maintenance system is an Equipment Record System that makes all information readily available & accessible to maintenance personnel and Owners.

The Equipment Record System should ensure that all sources of information are capable of being collated and cross-referenced so that all relevant parties can locate information on proper procedures and can schedule necessary maintenance. Record systems can be a simple/manual card system or an electronic version that is part of an advanced Asset Register.

Regardless of who undertakes any service and or maintenance work, the Pool Operator is responsible for maintaining proper maintenance records. .

# 9.0 PROBLEM SOLVING CHECKLIST

The ability of your Atlas filter to perform to specifications has been carefully ascertained and widely proven by extensive case history. When installed and operated in accordance with Instructions the Atlas Filter Company provides the original equipment purchaser with a Guarantee that the product is free from all manufactured defects. Refer to the complete Warranty Statement for further details.

If your filter does not perform to your satisfaction, we ask you to review the following Problem Solving List. In many cases, apparent problems can be resolved with simple reasoning. This will obviate unnecessary and expensive service calls.
If non-related products are connected within the filter circuit, it is necessary to ascertain that this equipment has been installed and operated according with that manufacturer's instructions.

## 9.1 Low Water Flow

| | |
|---|---|
| Check the pump's vacuum gauge reading - ideally it should be - 20kpa to - 40kpa | |
| Check the pre-pump strainer for collected debris - clean filter basket | |
| Check for restriction of blockage in both the suction or the return lines | |
| Incorrect pump selection | |
| Filter needs regeneration and or backwashing | |
| Pool water level too low - inadequate supply water, pump not fully primed | |
| Pump requires service; check rotation, internal blockage | |
| Pump operating under-speed (low voltage) | |
| Pump not performing to specifications - review pump gauge readings | |

## 9.2 Short Filter Cycles

| | |
|---|---|
| Filter operated without using an appropriate filter aid - review Operating Instructions | |
| Filter elements block - check the presence of calcium, cement dust, construction debris & defective pool paint. | |
| Filter elements sealed over with algae - check chlorine content & adjust as required | |
| Poor water chemistry - check pH and total alkalinity | |
| Inappropriate and prohibited use of coagulants and or flocculants | |
| Excessive pump flow - check performance and pump selection | |
| Filter elements blocked due to the use insufficient filter media - check media charge | |
| Filter not being effectively and regularly regenerated | |
| Ineffective backwashing - check conditions & ensure adequate backwash flow | |
| Wrong grade or type of filter media being used | |
| Filter needs annual service - consult Atlas Contractor/Service Agent | |
| Filter needs backwashing | |
| Filter requires annual service - refer to Atlas Contractor/Service Agent | |
| Incorrectly assembled filter elements | |

## 9.3 High Pressure on Start-Up

| | |
|---|---|
| Poorly planned or undersized return piping | |
| Insufficient return nozzles or adjustable nozzles excessively restricted | |
| Partially closed valve on the filtered water return line - review valve status | |
| Faulty pressure gauge - replace and review pressures | |
| Check correct installation & operation all equipment installed downstream of the filter | |
| Over-sized pump - check pump selection, review gauge & flow readings | |

## 9.4 Filter Media Returning To Pool

| | |
|---|---|
| Filter incorrectly installed - refer to installing contractor | |
| Incorrect valve operation - review operating instructions carefully | |
| Cloth covered filter element has torn, faulty element seals - refer to an Atlas Service Agent | |
| Filter socks not properly fitted and or clamped into place | |

ATLAS FILTERS
Patent No. 5847 43, 7795 46, & 7694 41. Patent Application No. 2002 307 607

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**THE ATLAS FILTER COMPANY**
**FULHAM ENGINEERING SERVICES PTY LTD (ABN 18 003 180 630)**
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# 10.0 RECORD THIS IMPORTANT INFORMATION

| | |
|---|---|
| Original Equipment Purchaser (OEP): | |
| Purchase Date: | |
| Filters Installed By (Name): | |
| Installers Contact Details: | |
| Project Consultant (if applicable): | |
| Owners Name (or Project Name): | |
| Handover Given To (Operators Name): | |
| Handover Date: | |
| Filter Models Supplied: | |
| Filter Serial Numbers: | |
| Certified Plant Capacity (m3/hr): | |
| Required BW Flow/Filter (l/sec): | |
| Replacement Media Required/Filter (kgs): | |
| Nearest Authorized Service Centre (ASC): | |
| ASC Contact Details: | |

# ATLAS® PRODUCT WARRANTY STATEMENT 2009

Atlas® filters are manufactured from quality materials in accordance with specific engineering standards, references, and quality procedures. Subject to the following Terms & Conditions, Fulham Engineering Services Pty Ltd (Atlas Filter Company, Australia) hereby warrants all Atlas® filters manufactured by it, to be free from defects in material and or workmanship for the periods stated in the following Schedules.

## Terms & Conditions

1. This product warranty is extended to the original equipment Purchaser and it is not transferable. The Warranty shall only apply, when the Terms of Payment contained within the original Supply Contract have been satisfied.
2. Products or components that fail or become defective during the prescribed Warranty period shall be repaired or replaced at our option without charge. Warranty repairs may be provided on-site or at the point of manufacture. The cost of any disconnection, disassembly, freight (to and from the manufacturer's premise) and any subsequent re-connection of the product or component, is not part of our warranty provisions. Location and the method of repair shall be at the sole discretion of Fulham Engineering Services Pty Ltd.
3. Warranty does not include fair wear and tear, or any failure to install, operate, and maintain the equipment in accordance with recommendations and information provided within technical data sheets and or Instruction Sheets. Warranty does not include problems arising from pump over sizing, undersized piping, operation without filter media, failure to shut down the pump before changing valves, problems arising from system design, over-pressurization, vacuum implosion, abuse, misuse, water damage, negligence or accident.
4. Atlas® pool filters are designed for water that is balanced in accordance with the Langelier Saturation Index with chemical concentrations as recommended by the State & Territory Health Departments. Any warranty claim is required to be supported with evidence that the product has been subject to recommended service and or maintenance and that pool water chemistry has been maintained on daily basis.
5. Warranty does not include or allow for any consequential damages or any associated costs or delays that may be incurred in obtaining warranty replacements.
6. The type & use of filter media selected by the Client is not part of our Warranty Statement.
7. The Atlas® Warranty is conditional upon all major service and maintenance work being done by an Authorized Service Agent using genuine replacement parts. Minimum service period is 12-months.
8. The air blower has specific installation requirements, whereby the validity of any warranty claim shall be subject to determinations made by the specific equipment manufacturer.

## Warranty Periods

Warranty becomes effective from the date of sale, NOT the date of installation.

| Item | Principal Construction | Material Warranty Period |
|---|---|---|
| Fabricated Filter Shell | Grade 316 Stainless Steel | Ten (10) Years (See Note) |
| FRP Filter Shells | Fibre Reinforced Plastic | Twelve Months |
| Filter Core | Injection moulded ABS | Two (2) Years |
| Filter Socks | Monofilament Fabric | Twelve Months |
| Tube/pressure Plate | Grade 18/8 Stainless Steel | Five (5) Years |
| Gaskets, O Rings, etc., | Neoprene | Twelve Months |
| Air Blower (Vacuum Transfer) | Casing & Electric Drive Motor | Twelve Months |

**Note:** Stainless Steel filter shell is a full five-year warranty, followed by a further five years on a pro rata basis that reduces to nil on the final year of the stated warranty period. Subject to terms & conditions, the design life of the Stainless Steel filter shell is considered to in excess of 25 years. The foregoing Warranties are given in lieu of all other conditions and warranties, expressed or implied, which might otherwise be binding on the Company. No responsibility shall be accepted for any consequential damages, or any other expenses.

## How to Obtain Warranty

As soon as a potential problem is identified, the end users first reference must be to the original Installer of the plant. If other non-related products are connected within the same circuit, it is necessary to ascertain that these products have been installed and operated in accordance with that manufacturer's Instructions. In order to assess the nature and the probable cause of a warranty claim, free access to the filter installation and all records must be provided. Maintenance of an Operator Log is a specific condition of Warranty.