



honeyman
WATER

Water and Steam

Generation and Distribution Systems



Assuring Compliance in Life Science

Operating extensively within the global pharmaceutical, biotech, medical device and related healthcare industries, the Honeyman Group has a well-earned and highly regarded reputation for technical problem solving, knowledge transfer and successful project delivery.

Whether it be manufacturing process issues, equipment and process upgrades, design and engineering, analytical support, audit preparation and responses, or simply an independent review of facility projects and operations, we have the technical expertise and knowledge to provide unbiased and regulatory compliant solutions and advice.

Honeyman's unique position in the market as a holistic service, product and knowledge provider, is built on decades of close alliances with clients, suppliers and industry experts.



Water and Steam: Purified Water & WFI generation and storage, URS consultancy, IQ/OQ and PQ validation, Maintenance and troubleshooting, Consultancy.



Contract Laboratory: Water and clean steam testing, Finished Products QC release Microbiology, and Finished Product QC release Chemistry, Clean room validation support (e.g. DET, Environmental Monitoring).



Validation Services: Thermal mapping, Cycle development, Control system upgrades, Service and maintenance, Environmental monitoring.



Training: Public Courses, Onsite Courses both generic and bespoke, e-Learning (generic or bespoke solutions), Consultation.



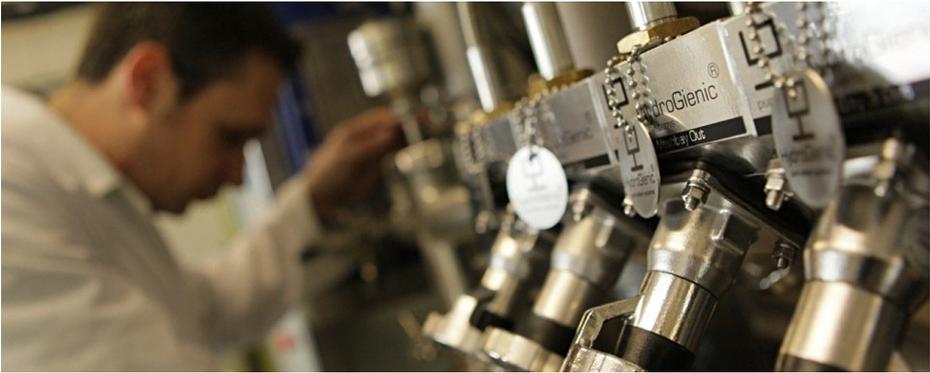
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A TRANSPARENT & FRIENDLY APPROACH

As a valued client of Honeyman Water, you will have regular interaction with your appointed account manager and dedicated contacts.

We pride ourselves for being close to our clients, and are often regarded as an extension to their own organisation.

This brochure provides a general overview of the services that Honeyman Water can offer.

Whether it's a one-off project, regular service or maintenance or if you need help with an urgent problem, we happily hear from you.

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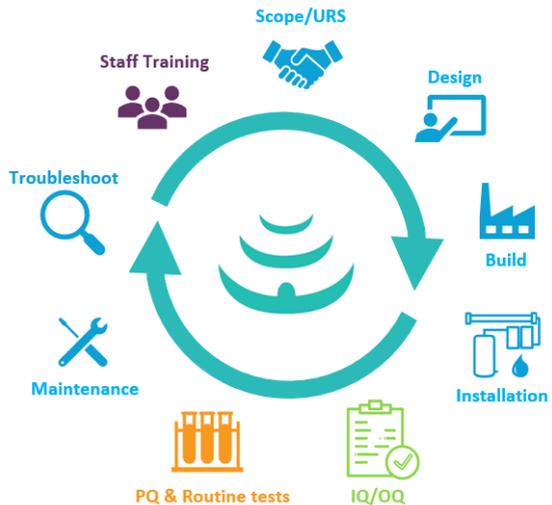
WHY HONEYMAN WATER?

For decades Honeyman has been synonymous with highly efficient, innovative and quality water systems.

Leading pharmaceutical manufacturers turn to us for expertise and knowledge on purified water, water for injection (WFI) and pure steam generation and distribution systems.

Honeyman is uniquely positioned in the market by being able to offer expertise at all stages of your purified water, WFI and steam needs, including:

- ✓ Initial Consultation and Feasibility
- ✓ Support in the development of your URS
- ✓ Turnkey project management from design, build, installation to PQ
- ✓ Improving the performance of your current generation distribution system
- ✓ Upgrading your control systems
- ✓ Troubleshooting and maintenance
- ✓ Staff training: Pharmaceutical water systems, Principles and Practice®



When quality, compliance, flexibility and efficiency are at the essence of your existing or new purified or WFI water system, there is no better place to turn to Honeyman.

PROJECT SCOPING & URS

The first step in any successful project is being able to clearly define outcomes and goals.

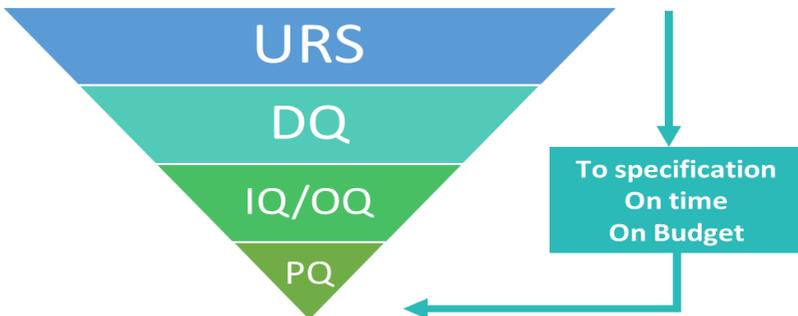
What do you want from your water system? Whilst that may seem a simple question, getting to the correct answers isn't always as straight forward as it seems. A badly specified system can put unnecessary constraints on site operations and can be costly to rectify once installed.

At Honeyman, we can join you at the **beginning of projects**; whether you have a new system requirement or need to amend a current system, we can help you plan and ask the right questions to enable the correctly installed system within your facility.

Following a detailed consultation with the Honeyman team, we can efficiently produce a precise and clearly defined URS that all project stake holders can buy into.

Utilising our decades of experience in quality water systems, you can be confident of receiving the very best system for your facility, meeting your requirements and whilst ensuring regulatory compliance.

Best approach—a good URS reduces iteration, surprises, unplanned events and problems.



DESIGN & DOCUMENTATION

The Honeyman Group has built-up a long-standing reputation as the industry's leading expert in purified water, WFI and pure steam systems.

Headed up by Dr. Alan Bateson, the Honeyman design team has been providing reliable and carefully planned designs in 2D/3D for over 25 years.

In addition to designing Honeyman's own range of PW/WFI generation and distribution systems called HydroGienic®, the team also carries out design work for a range of clients and third party equipment vendors.

With hundreds of new and modified systems over the years for a broad range of clients, our experience has led Honeyman to design extremely

innovative systems with a proven track record of delivering some of the most reliable and trusted systems in the industry.

Our Design, Your Assurance:

- ☑ meet regulatory requirements
- ☑ easy to validate
- ☑ ensure maximum life span of the installation
- ☑ straightforward to maintain with minimal downtime
- ☑ can be upgradeable



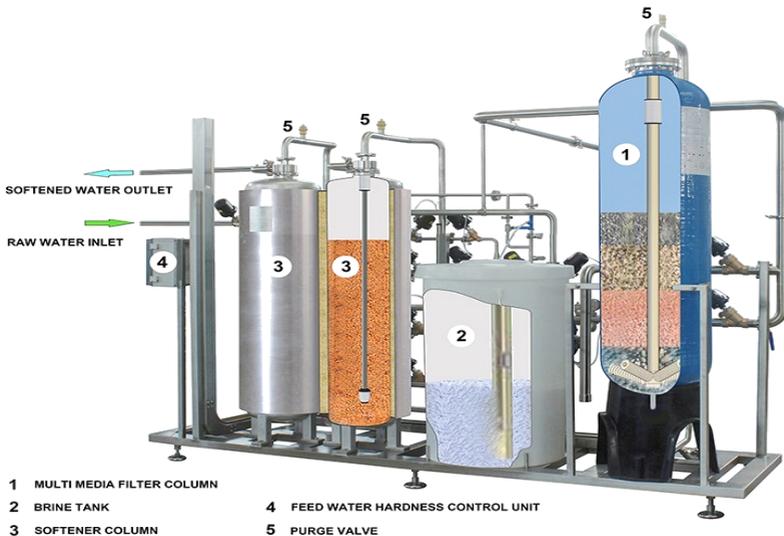
Purified Water, WFI and Pure Steam Generation

The Honeyman Group has built-up a long-standing reputation as the industry's leading expert in purified water, WFI and pure steam generation.

A badly specified system can put unnecessary constraints on site operations and can be costly to rectify once installed.

Our first step in any successful project is being able to clearly define outcomes and goals. What do you need from your water system? Whilst that may seem a simple question, getting to the correct answers isn't always as straight forward as it seems.

Following a careful evaluation of site feed water by Honeyman Validation and Laboratories, Honeyman Water will design a suitable Pre-treatment for manufacture.



Example of a skid mounted pre-treatment system

Raw water can be pre-treated to remove contaminants through steps including UV lamps, microfiltration, ultrafiltration, multimedia filters, softeners.

To ensure an effective microbial

control, systems can be specified to be hot water sanitisable.

In partnership with BRAM-COR S.p.A based in Italy, Honeyman can offer bespoke solutions to suit your requirements:

☑	RO Water Generation	100—20,000lp/h
☑	Purified Water Generation	100—20,000lp/h
☑	WFI & Distillers	20—20,000 lp/h
☑	Pure Steam Generators	20—5000 kg/h

Having selected the correct pre-treatment system, Honeyman will then design a bespoke purified water generation system. Skids can be designed to generate PW at a rate between 100-20,000 lph.

Purified water is usually obtained through a single or double osmotic stage and for a higher quality, water is additionally passed through a continuous electro-deionizer.

- ☑ Complies with GMP and regulatory body requirements
- ☑ Sanitary in-line instrumentation to monitor product critical parameters such as conductivity, temperature, Ozone in water, TOC and pH.
- ☑ Chemical, Heat or Ozone sanitisable



Large Capacity skid mounted cEDI / RO generation system



Single Effect Distiller

The single effect distiller is both a Still and a Pure Steam Generator. This equipment produces dry, saturated steam that can be used for sterilisation. The pure steam when condensed through a double tube sheet condenser, meets the requirements of WFI.



Multiple Effect Distiller

The Multiple Effect Stills are designed and manufactured according to cGMP to produce Water for Injection. Each unit contains a number of boiling columns (or effects) with the first column producing pure steam, which is condensed and re-distilled in the following columns decreasing operational costs.



Vapour Compression Distiller

The Vapour Compressions Distiller can produce both hot or cold distillate with huge savings of energy costs and with no need of cooling water. Vapour compression distillers operate with electrical heating and/or plant steam. Capacities range from 20 –20,000 lph.



Pure Steam Generator

With a capacity ranging from 20-5000 kg/h, the Honeyman Pure Steam Generator produces dry, saturated steam, suitable for a wide range of uses within the pharmaceutical production plant.

Purified Water / WFI Storage & Distribution

Once water has been produced at the desired grade, it needs to be stored and distributed to the users within the facility whilst maintaining its quality. Honeyman can design and build any sized vessel to a range of finishes suitable for storage of bulk compendial grade water. With regards distribution, Honeyman offers two solutions.

- ☑ Conventional Stainless Steel ring mains
- ☑ HydroGienic® parallel distribution

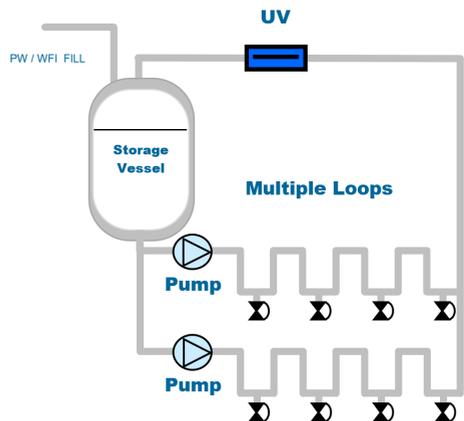
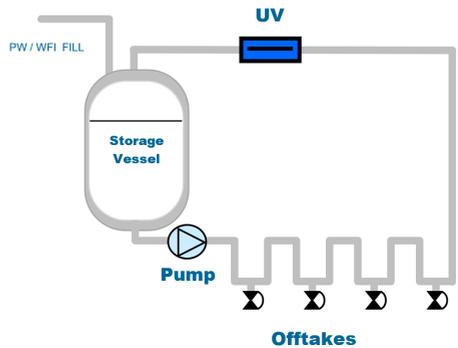
Whilst both systems are suitable for all grades of water, and fully sanitisable by heat, Ozone and chemicals, there is a distinct difference between the two options.

Conventional stainless steel loop

A conventional stainless steel ring main design typically involves pumping water from the vessel around the facility to a number of different user points or off-takes in a serial connection and back to the storage vessel.

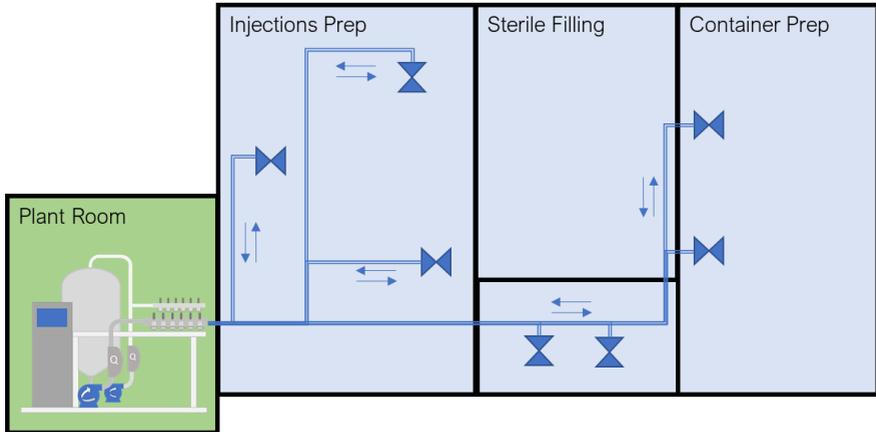
Careful considerations should be given to the design, layout and capacity of the loop, to ensure sufficient flow rates are being delivered to each user point irrespective of which user point is being operated.

Honeyman's design and engineering team have decades of experience, dating back to the 1970's where water distribution systems evolved from a "Christmas tree" design (with many dead legs and no circulation) to the conventional serial loop to the now more commonly used parallel loop or HydroGienic®.



HydroGienic®

HydroGienic® is an innovative, proven and patented pure water distribution system, delivering purified water or WFI to each point of use directly from the storage tank through PTFE hoses in a parallel delivery, rather than the conventional way of a stainless steel ring mains.



Example parallel layout of a HydroGienic® system

The innovative part is the way that high volumes of water can be delivered to each user point through relatively small borehole PTFE hoses, thanks to a patented dual manifold system, allowing water to continuously circulate and deliver flow to each user as and when required.

The HydroGienic® distribution skid and PTFE hoses are suitable for **all grades of purified water**, and are fully sanitisable by heat, Ozone and chemicals.

The use of PTFE hoses leads to simple installation from the plant room to each point of use, and does not require hot welding.

With a HydroGienic® system there is no need to use and dispose of harmful

chemicals, needed to passivate stainless steel pipes after welding, making HydroGienic® a more environmentally friendly system.

Each user point is connected in parallel, so additional user points can be added without disrupting other user points unlike conventional stainless steel systems where the complete loop has to be drained, prior to cutting into the loop.

HydroGienic® removes the need to drain the distribution loop, thus keeping production output as normal. Therefore, minimising disruption to the facility and offering potential cost savings of £ hundreds of thousands in lost revenue.

Key benefits of HydroGienic® over conventional stainless steel loops

- ✓ 75% reduction in “plant room to offtake” installation time, vastly reducing facility disruption, overall project time and cost
- ✓ HydroGienic® can provide capital savings in the order of 25%
- ✓ No degreasing or passivation of the piping system required, reducing time, cost and avoid having to discard of harmful chemicals
- ✓ No hot welding means reduced validation effort, time and cost
- ✓ Guaranteed flow rates and pressures to all user offtakes irrespective of usage ensures maximum output is obtained
- ✓ Easy to install along existing conventional water systems requiring new or additional users without disruption to the existing distribution loop



INSTALL AND COMMISSIONING

Following a successful build and Factory Acceptance Test (FAT), equipment will be shipped to site. On arrival, equipment will be unloaded and safely sited and secured in the plant room.

Our experienced, trained engineers of a variety of disciplines will set to work assembling the plant and connect to site services. After the equipment has been brought online, qualification and commissioning activities will begin.

IQ / OQ / PQ

IQ of generation, storage and distribution systems are a critical part of validation as they are built and assembled onsite.

Its essential to have documented evidence of correct materials, construction and that the components have been installed correctly.

For conventional water systems, it is critical to ensure that all welding and finishes meet the desired and required specifications and that work has been carried out by suitably qualified personnel.

OQ Verifies that the equipment upon installation works within the desired operating ranges. The final stage of OQ is the verification and testing of the water to ensure it meets the pharmacopeial or user defined specifications.



For high intensity **PQ** phases over 28 days we have a dedicated courier and laboratory team that work weekdays and weekends.

Any out-of-specification results are investigated fully upon client request to ensure the swift resolution of any issues that may arise.

Our microbiological and chemical analysis includes:

- Total Organic Carbon (TOC) Analysis
- Total Viable Count (TVC) Analysis
- Wet Chemical Tests for Pre-Treatment and Purification Assessment
- Quantitative Endotoxin (LAL) Analysis
- Absence of Objectionable Organisms
- Conductivity
- HTM 2030
- HTM 2031 for Dishwasher Disinfectant Water and Clean Steam Samples.
- Condensate analysis to HTM 2010, EN 285 or Water For Injection (WFI) specifications.

MAINTENANCE AND BREAKDOWN

Our cost effective, flexible service and maintenance plans can be tailored to include a range of routine and breakdown services as required. All our maintenance services are matched to the exact requirements of each individual system or piece of equipment.

As the industry's leading, independent specialists in high



purity water systems and sterilisation processes we can provide comprehensive service and

maintenance cover for a range of quality critical utility processes and equipment including:

- ☑ **PW/WFI Purification, Storage and Distribution** (including Elga/Veolia, Stilmas, Bram-Cor, Purite, BCD, BWT, Bosch, Telstar)
- ☑ **Pure/Clean Steam Generators** (including Telstar, Stilmas, BWT, Spirax Sarco, Steris)
- ☑ **Autoclaves** (including Getinge, Fedegari, LAST, Denley, Boxer, Tuttnauer, BMT, BMM Weston)
- ☑ **Ovens, Disinfectors, Washers**

Our strength is the range of specialist in-house expertise we bring to each project. We can provide the combination of design, engineering, technical, microbiological, regulatory and project management expertise which is essential to meet quality –as well as time and cost – criteria.

Using Honeyman over various OEM contracts offers;

- ☑ Lower maintenance prices compared to OEM's
- ☑ Support for legacy systems no longer handled by the OEM
- ☑ Single Support Contract for multiple manufacturers
- ☑ Support backed up by our

TRAINING & CONSULTATION

Honeyman offers a professional level training program on “Pharmaceutical Water Systems: Principles in Practice®” which provides a much broader overview of water system design, functionality and regulatory expectations.

This interactive program will see delegates apply their newly acquired knowledge and design their very own water system, which will be fine tuned as the course progresses until they end-up with a highly efficient and effective PW/ WFI water system.



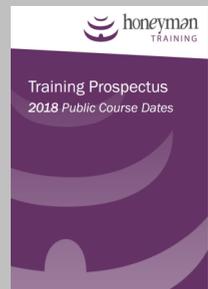
Delegates on this course have the option to become an ‘Accredited Specialist’ in Pharmaceutical Water Systems. This accreditation is run in conjunction with Teesside University.



Visit our website www.honeymantraining.com for our current course prospectus or contact us if you would like a bespoke course delivered on your site.

Download our Public Training Course Prospectus at:

www.honeymantraining.com



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