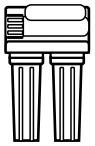
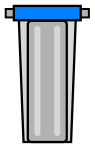
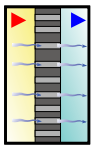
general information



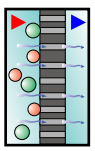
Hyper-filtration systems are plumbed into naturally soft or softened water feeds for scale free kettles with high purity filtering to remove chlorine, sodium, fluoride, nitrates, nitrites, cryptosporidium, heavy metals, pesticides, colour, odour, taste, grit etc. Hyper-filtration membranes last longer on soft water and booster pumps are less likely to fail prematurely.



Single carbon filters are not as effective as hyper-filtration. They are fed off hard water and leave the water hard, but they reduce chlorine, colour, odour, taste, pesticides and sediment better and cheaper than Brita jug filters and range from 0.2 - 10 microns. (A human hair is around 70 microns thick.) Hyper-filtration include 2 to 3 carbon filters.



The recommendations for chlorine levels in drinking water are usually 0.1 to 0.2 ppm in Ireland to sterilise bacteria. Excessive chlorine is easily detectable and can be filtered out prior to drinking for a better taste. Water schemes are monitored by sanitary authorities, but additional filtering may often be required for better taste and peace of mind.



E.coli indicates the potential risk of other more harmful organisms in water and limits may be exceeded after flooding. Micro-organisms range from below 0.1 microns to over 10 microns. Most types can be blocked by 0.5 sub-micron filters (Doulton ceramic) along with ultra-violet sterilisation as an option, or hyper-filtration.

Water is classed by the EPA as being soft below 50 ppm of lime and hard at over 200 ppm, then causing damage to pipework. Many water schemes are extremely hard at around 400 ppm, especially in Galway County. Water softeners will soften hard water to as low as 1ppm or better, at the ultimate end of the scale for softness classification.

With softened water, Calgon and scale cleaners are no longer required. Shampoo, powders, detergents and soap form full lathers and last twice as long. Clothes will feel softer and gain higher durability. Skin feels much softer and itches less often. The low running costs of salt in softeners will more than be met by the savings made on cleaning products alone.

Heating of hard water causes lime to solidify, but existing scale in showers, dishwashers, washing machines, irons, heating elements, attic tanks, copper cylinders and household pipework will be dissolved by soft water, eliminating further damage or heat loss. Immersions and heating coils will return back to full efficiency if previously scaled by lime.

For water softeners, tablet type salt should be used and only the Axal Pro brand. Salt can be bought from hardware stores from 6.50 euros per 25kg bag. Normal household use is one bag every 2 months when used with salt efficient water softeners. Don't use fine salt granules, or Broxo salt as these often clog up salt bins and block brine siphons.

Sodium should remain below the EU 200 mg/litre limit if you soften water below 400 ppm of lime with normal background sodium levels. Laboratories can provide sodium tests on softened water for peace of mind or a hyper-filtration system will guarantee to provide water with sodium levels below 1/20th of the level of the strictest EU water limit.

water softening

Back in the era of steam power, UK and US companies discovered that water softening could help steam engines beset by limescale. Early pioneers Kennicott (1902) and Permutit (1908) along with Clack and Culligan (1940's) were followed later on by larger corporations such as General Electric and Siemens.

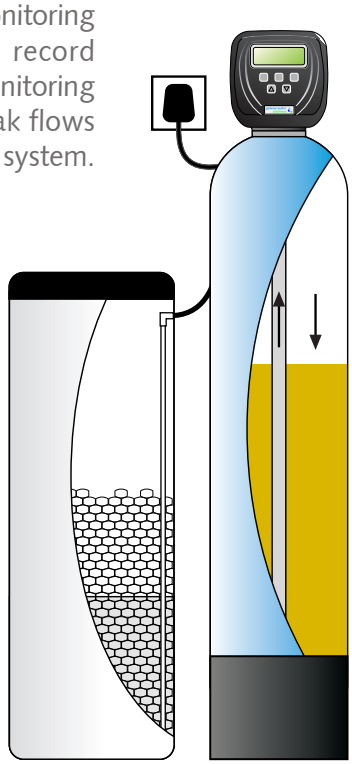
Water softening is the removal of dissolved limestone rock from hard water, using a reversable ion exchange process - swapping problematic ions with harmless sodium ions. Limescale causes household plumbing damage and the problems of itchy skin, badly washed hair, scaling, staining and poor results in washing clothes in the curd-like scum caused when lime comes into contact with washing powder.

Modern water softeners utilise flow monitoring and electronic memory functions to record chronological system performance, monitoring the water volumes, backwash and peak flows with high reliablility over the life of the system.

Water softeners are sealed with a long life food grade polymer resin that cause calcium ions in hard water to cling to the resin over a number of days until the softener decides to wash all the lime collected out into a waste pipe, using a brine solution to regenerate the resin.

Efficient softeners use 2 euros of electricity and between 4 to 8 bags of salt per year. Salt use depends on water hardness and amount of water used. Bags of salt cost from 6.50 euros, about 25 to 50 euros per year.

By installing a water softener, the savings on many household cleaning and bathing products along with plumbing repairs can amount to 300 euros per year, enough to repay the cost of a water softener in 2 to 4 years, - along with improving quality of life - the feel of clothes and skin and a positive saving in the effort spent on many household chores where lime causes stains.



*KDF Bacteriostatic options available.

Sodium levels in softened water - too low to taste, are usually below the EU limit of 200 mg/l and below the sodium level of many carbonated soft drinks classed as "sodium free".

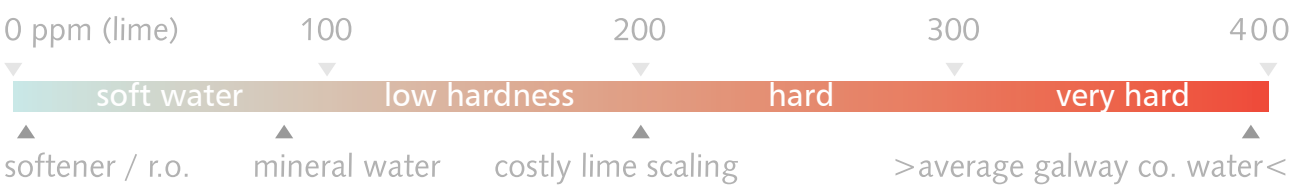
Milk contains 500 mg/l sodium most soups contains 3000 mg/l - the average supermarket or Heinz soups carry 20 times the sodium level of softened water.

Milk, soup and soft water are harmless although the medical advice for mixing baby formula should be adhered to when mixing with a given water type.

The healthy sodium intake we require daily is 2,400 mg equal to the sodium usually found in 30-40 pints of softened water.

Softening employs a reversible exchange (non-reaction) process known as "ion (cation) exchange" or "mono-divalent exchange".

Positive calcium ions (cations) cling to negatively charged styrene beads and are removed by "brining" a solution of sodium ions.



hyper-filtration

In 1959 UCLA, California introduced cross flow membrane technology attaining hyper-filtration level to salt water desalination standards without need for distillation or undue loss of mineral balance. The first plants began operation in 1965 producing 22 m3 per day. This discovery launched an industry that now has thousands of major global hyper-filtration plants, producing 4,000 m3 of drinking water daily.

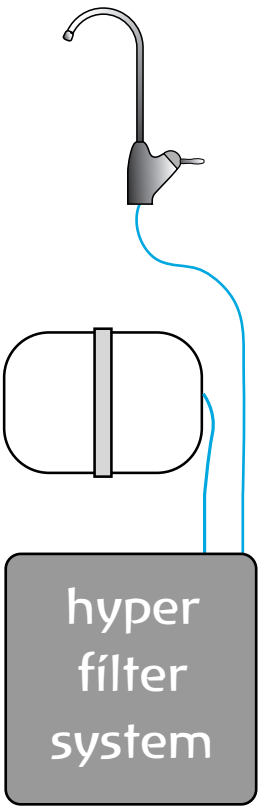
For decades around the world, hyperfiltration has been used for domestic 'point of use filtration' offering safe drinking water on tap reducing carbon footprints dramatically. Consumers pay around 10 - 20 euros per week or 500 to 1000 euros every year for bottled water, plus transportation and landfill costs.

Domestic hyper-filtration systems are either standard systems with universal cartridges, compact manifold design or quick release cartridge design, up to very high specification Swedish made commercial standards.

Premium hyper filtration systems are usually WQA/NSF certified with booster pumps and mineralisation providing from 20ppm mineral content similar to spring water up to hard mineral water levels after filtration.

Hyper-filters require cartridges every 1-2 years, once pre-filter life reduces. Membrane elements will last up to 5 years depending on incoming water quality and can be tested at anytime for TDS performance.

Domestically, hyper-filter systems feed mini drinking taps from 1% of the mains supply for potable use rather than the 99% of the whole house supply, which are fed by larger pipes and flow rates.



Hyper-filtration "cross flow" filters are the only systems domestically available able to remove impurities at the "hyper-filtration" range at 0.0001 micron or molecular level.

Properly specified hyper-filters have chlorine removal to well over 99%, with cryptosporidium removal well over 99.9% to a fraction of HSE limits along with toxin removal.

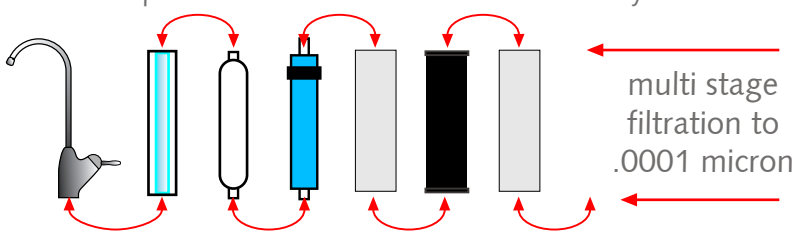
Benefits of hyper-filtration are the efficient removal of toxic metals, nitrates, fluoride, sodium, bacteria and an extensive list of the harmful parameters often found in water.

It is rare for hyper-filter purified water to require final adjustment for taste. Food grade granular lime mineral cartridges are available if preferred after a water softener.

Hyper-filtration works best on water free of lime and protected from high iron, manganese and turbidity.

Water pressure should be regulated. Booster pumps should be used to raise pressure to controlled and regulated levels - also to raise low mains pressure.

Hyper-filtration uses thin film semi-porous membranes with cross-flow filtration plus conventional filters to deliver extremely safe water.



Water is pressurised and fed via a membrane to deliver an ionically pure water stream separate to a concentrated waste water stream.

household ultraviolet disinfection

Using ultra violet to sterilise bacteria, began in the 1960's and later on Atlantic, Trojan and Wedeco developed commercial systems. Due to the success of ultra violet sterilisers, affordable systems became available, recommended by health authorities for safe bacterial sterilisation of contaminated supplies.

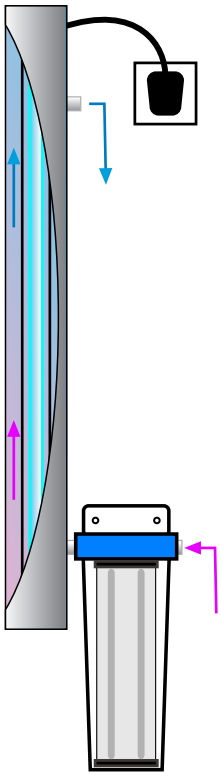
Ultra violet has now become the safest and most effective form of bacterial sterilisation available, with working efficiences of up to 99.999999%. Allowing a calculated flow of infected water to be passed in close contact with a high intensity UV light source deactivates the reproductive dna of viruses, bacteria and cysts, rendering them completely harmless, as long as pre-treated water is clear and free of colour.

Modern UV sterilisers use hour counting meters to monitor UV bulb life and ensure optimum sterilising power along with audible and visual LED indicators incase of any possible bulb failure.

For peace of mind, UV systems can be upgraded to double the effective bacteria kill rate, also the feed back of the UV light intensity can be monitored using a built in needle guage to give a clear idea of actual bulb life. These are available on the new commercial models.

UV systems for household use typically operate on a power usage of around 20 to 40 watts and require a new bulb every 12 months or 9000 hours, along with annually changed 5 micron prefilter cartridges.

A wide range of common and less common bacterial pathogens are effectively destroyed by passing through a UV light chamber.



Health authorities rate safe levels of contamination as less than 1 organism in 10 litres of mains water with bacteriocidal systems requiring to be effective above the 99.95 % sterilisation range.

When levels of contamination are recorded in a water supply by measuring an average level of pathogens per litre of water, it becomes easy to calculate a safe threshold for drinking use.

If a mains water scheme has established a good track record of disinfection using modern treatment, the level of post treatment at domestic level should be able to be kept to a minimum.

UV systems offer good sterilisation for well water, springs, raintanks.

UV systems work best on water free of lime, colour, turbidity and insolubles that obstruct the UV rays.

Unless water is naturally soft, sourced from a granite rock area, a water softener will guarantee to soften any level of scaling especially hardness levels above 50 ppm. Most Galway water is 400 ppm.

UV sterilisation de-activates reproductive strands of dna in bacteria using high power rays in the UV-C spectrum at 253.7 nanometers.

Once sterilised, bacteria, viruses and cysts are rendered completely harmless, and die immediately after any attempt to reproduce.

mains water problems

In many parts of Ireland, water is supplied from lakes or rivers, raintanks or wells, but most is from borehole fed group schemes containing excessively high levels of dissolved lime.

We use on average around 20 gallons of water per person each day, for flushing toilets and bathing, to watering the garden or making cups of tea. Most mains water schemes lose 20 gallons per person per day before it reaches households. Only 1%-2% of mains fed water is used for drinking, but as the 99% is used for the likes of flushing toilets and baths, the hopes of local rural water schemes using water treatment technology such as hyperfilters and ultra-violet sterilisation, is unlikely to be offered at source often due to funding limitations and because the basic EU water limits are just aimed to be met at low budget.

So private household filtration methods used for the 1% of drinking water, even water for general domestic water, is often self-funded by householders. Galway County did have a higher compliance of meeting EU water limits historically compared to other counties, but many local schemes fail to provide superior water supplies for other reasons listed below:

1 Many group water schemes may have old boreholes drilled on limited budgets. Newer drilling methods, well casings, better locations and bore depths, can offer better water.

2 The expense to treat water to more demanding levels of legislation is often prohibitive for smaller group schemes often run by voluntary efforts, with low cost water fees charged.

3 Old pipelines can often leak the water supplied with the risk of bacterial infection finding its way back into the supply at leak points and poor pressure often in hot weather.

4 Group water schemes react to contamination problems slowly, relying on occasional HSE water monitoring and the news of contamination to be passed by word of mouth.

5 Boil water notices are sometimes posted to the local shop after detection of bacteria on particular group water schemes instead of all scheme residents being notified individually.

6 Lime is not seen as a danger to health and is found at high levels on most schemes. Water regulations do not set limits for lime levels, yet it causes extensive and costly damage.

7 Surprisingly, 3 things that put people off water; odour, colour and taste, have less importance as testing parameters, even when recipients of scheme water voice objections.

8 Bacteria has always been given serious priority and has sample limits of “zero” in water tests, making chlorine dosing essential to mains water adding to taste and smell.

9 Micro-organisms such as cryptosporidium evade chlorination and small group schemes, even large city schemes upgrade often far too late to correct ongoing problems.

10 Annual spring flooding has an adverse pressure on the source water quality of a great number of lake, river and even borehole fed waters, leading to long periods of contamination.

11 Water pressure on many schemes is poorly regulated and if insufficient or excessively high, with small schemes rarely addressing pressure variations promptly and correctly.

12 It is unlikely for most schemes to address all infrastructural mains problems and of meeting total compliance to EU directives to the point of total consumer satisfaction and trust, (free of lime and to an exceptionally consistent potable level of domestic supply.)

mains pressure

Mains water pressure should be tested prior to the installation of any kind of water treatment system and monitored for irregularities in water scheme pressure that may affect the operation of filtration equipment or other household plumbing or appliances.

Most water schemes operate in the normal water pressure range of 22 to 70 psi, although many schemes experience water pressure problems. A rare problem is low pressure, where water fails to fill attic storage tanks at an adequate rate causing periodic water shortages.

Dangerous pressure up to 100 psi exists in many water schemes and high pressure spikes may occur unannounced in relatively low pressure schemes, which can cause leaks and problems with filter systems, so some form of reliable pressure correction is often required.

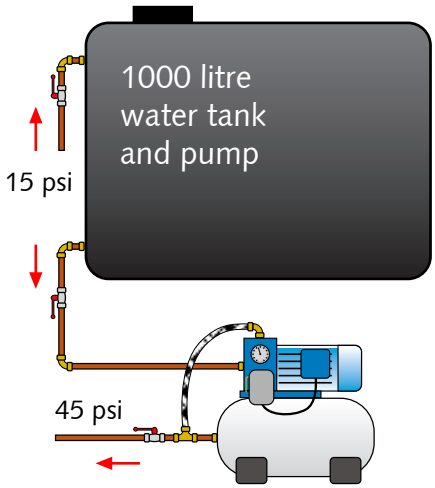
If you have paid a water scheme connection charges or other fees, you are covered by consumer rights legislation and are entitled to a range of minimum standards that water schemes are obliged to deliver, including for example: regulated water pressure, continuity of supply, sufficient notice given to interruption of supply due to works carried out, etc.

low Pressure

If mains water is found to be too low, water softeners, filters, showers and washing machines may not work.

To guarantee an adequate supply from weak water mains a water tank will collect mains water in reserve with a pump to boost the water back within the normal pressure range. Pumps are usually set between 25 to 45 psi.

Before you decide to go to the expense of installing a water tank and pump, consult your water scheme of your consumer rights to be provided with a continuity of water at a minimum correct pressure at all times.



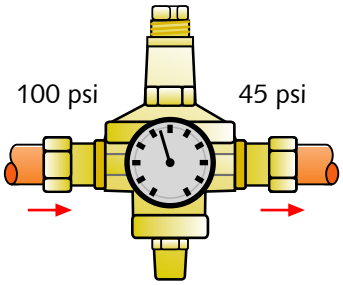
high Pressure

If mains water pressure is too high, water filters may leak. To guarantee correctly regulated water pressure, install a pressure regulator to maintain an optimum water supply pressure for full protection.

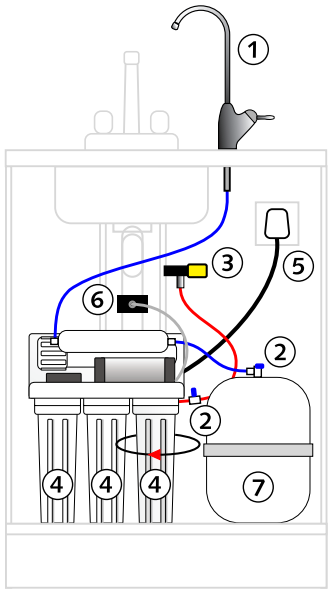
To correct high pressure problems, a high quality pressure reducing valve is available at discount when bought with a water softener or reverse osmosis filter.

Water schemes are under an obligation to limit overly dangerous water pressure to households and will be liable to meet the expense of correcting it.

See the consumer rights charter at : www.nfgws.ie



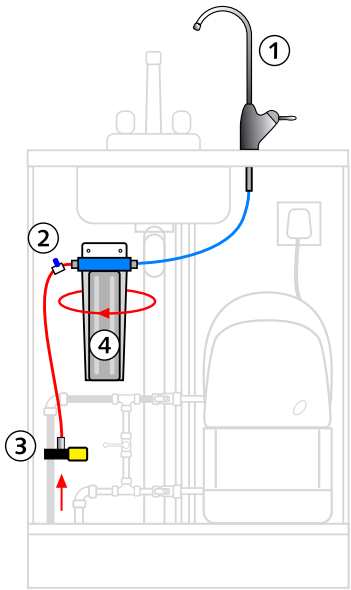
filter systems - install



a) Drill 12mm hole for faucet (1) in the sink or work top. Fit chrome disc and rubber washer to faucet, or small rubber washer without chrome disc if space is limited. Feed faucet into hole and tighten up with nut. Push end of tube into filter 'out' port.

b) Fit valve (2) to vessel (7) if installing an RO, using sealing tape if required and fit other valve (2) to red tube on item (3). Connect tube to pressure vessel, fit other end to correct port.

c) See fitting instructions for item (3) found in pack. Do not clamp to copper pipes on mixer taps. Clamp to 1/2" cold pipe, checking on plastic pipes, the hole has been cut clean and water flows adequately. Push fit end of red tube into filter 'in' port.



d) For hyper-filters, clamp waste saddle (6) to a waste pipe. On horizontal wastes, position saddle with tube port pointing up. Once clamped, drill 6mm hole into waste pipe, connect tube to saddle (6) and fit other end into the waste port on hyper-filter.

e) Fit cartridge/s and place the filter unit in to cupboard with all valves open. Plug hyper-filter in to electric and switch on. The pump should then start up quietly. Run tap for a few minutes on mini filter units. Wait an hour in the case of hyper-filters then open tap and allow tank to run dry. Repeat twice. Then check for leaks, tighten filter housings (4) if required.

filter systems - service

a) Open faucet (1) and run water. Close mini valves (2). Close valve (3) if there is no other valves by turning yellow knob several turns until water stops flowing from the faucet.

b) Position a plate or bowl below filter housing bodies (4) to collect any drips. Unscrew the lower body/ies of filter housing/s. Use plastic spanner, incase housings are difficult to unscrew. Carefully position the filter body/ies over the sink and pour out excess water, removing old filter cartridge/s and flush out housing checking that seal/s remain in place.

c) See (e) above. Pour out a sample of water noting that any fine air bubbles that appear as white cloudiness, should disperse within 30 seconds. See water testing page for further info.

d) Replace standard cartridges at manufacturer's rated filter life or after one year for pre-filters on a reverse osmosis system. High quality NSF filter cartridges may last up to 2 years and can be checked for performance with chlorine DPD tablets on chlorinated water. Replace RO membranes after 4 years on a soft water feed.

For further information on water testing kits, see : palintest.com or hach.com

system installation

Water softeners are located to treat water at the point of entry to a household to feed the whole house, except garden taps used for watering plants and lawns. They can be put in a garage, shed, utility room, boiler room, kitchen, hotpress, weather-proof cabinets on an external wall. WATER SOFTENERS REQUIRE NEARBY WASTE PIPE / DRAIN AND AN ELECTRIC SOCKET.

Make sure your plumber ensures that just one mains supply is piped from the property boundary and leads to the external wall to the kitchen sink or to a garage or shed close to a drain gulley, entering and leaving the garage and on to the house entering inside the external wall behind the kitchen sink ALLOWING TEE CONNECTIONS TO BE ACCESSIBLE ABOVE FLOOR LEVEL.

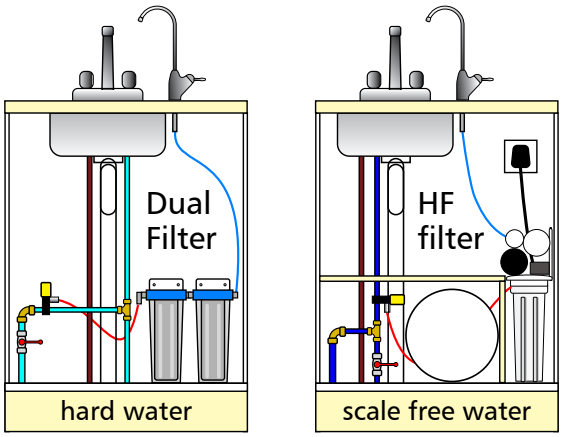
Never bury mains water tee fittings under concrete floors or take short cuts from front garden walls to the front of the house into a hot press or teeing off to terminate at the kitchen sink. An extra pipe can be routed from behind the kitchen sink back under the floor to a central kitchen island or American fridge fed from a hyper-filter located under the sink cuboard.

The mains pressure must be within 20psi to 70psi or it will need to be regulated.

Convert float switched pumped systems, to ballcock pressure fed pumped systems if poss.

Do not install softeners on wells with 0.2 ppm+ of iron or 0.05 ppm+ of manganese.

Well water should be tested by approved INAB or official HSE laboratories.



servicing

- Filters can be replaced before set service intervals if poor flow or testing indicate expiry.
- Filter cartridges are usually changed within 1-2 years, membranes between 2-10 years.
- We automatically remind clients when filter cartridges and/or softener servicing is due.
- Use HF filter systems and UV sterilisers on soft water. Change UV bulbs each year.
- Refill full softener cation resin every ten years to fully renew the softener's performance.
- All well water systems require a customised service interval based on system performance from year to year. It is recommended to perform interim water analyses on many wells.
- All equipment details and water source details are recorded upon equipment installation. We will remind clients of service intervals due, eg. for water softeners :

clean screens / injectors	test for water hardness	check all valve settings
check water pressure	check flow rate & history	check flow metering
re-test regeneration	clean / sterilise tanks	complete basic checks
catalyst and media refills	replace any worn seals	check water parameters