



EnwaMatic® Technical Description

FUNCTION

- Side-stream filtration to < 10 microns, with a backwash process to clean and re-use the filter media.
- Self-regulating pH control, maintaining a level of 9.0 – 10.5.
- Inhibition of corrosion through pH regulation – maintaining a total iron level of < 1.0 mg/l.
- Regulation of hardness in LTHW systems through calcite / dolomite media filtration.
- Removal of excess air through integral air separation device.
- Restriction of bacterial growth through improved environmental conditions.

APPLICATIONS

Closed systems, including low and medium temperature heating, chilled water and condenser systems.
Other closed systems including process and engine cooling.

Standard units to 95°C and 10 bar.

Bespoke units for higher temperature (to 150°C) and pressures (to PN25). *Refer to Enwa Bespoke Brochure*

Can be used alongside glycol to 40%. The 'BAF' glycol retaining backwash system should be selected for these applications. *Refer to Enwa BAF Manual*

Suitable as a complementary treatment alongside standard biocides where required.

FILTRATION ONLY APPLICATIONS

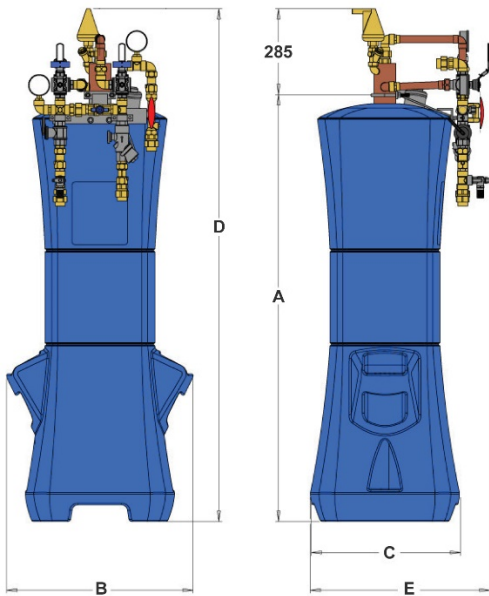
ENWA can supply units to operate as side stream filters only, without the pH elevating media. Applications include systems where elevated pH is not suitable (aluminium components), open cooling systems or for projects where alternative types of water treatment are required.

Units are denoted as **EFO** (Enwa Filter Only). The units and associated equipment are otherwise identical to **EM** (EnwaMatic) units and subsequent information, manuals and schematics are applicable to both unless otherwise stated.

UNIT SELECTION

EM unit selections are based on total system volume. Where this information is not known, it is typically estimated from heating / cooling input in kW. Volume of thermal stores, buffer vessels and extensive pipe runs must also be considered.

Model	System Volume (m ³)	Approx kW @ 12 litres / kW
EM 825	0 – 5	0 – 400
EM 1252	5 – 15	400 – 1250
EM 1260	15 – 40	1250 – 3330
EM 1665	40 – 80	3330 – 6660
EM 1672	80 - 130	6660 – 10,830
Bespoke	130 - 600	10 MW +



Installation data					
Model EM / EFO	825	1252	1260	1665	1672
Total height D (mm)	1440	1640	1940	2054	2254
Width B (mm)	597	597	597	697	697
Casing Depth C (mm)	477	477	477	577	577
Total Depth E (mm)	575	575	575	731	756
Height to service port A (mm)	1164	1364	1664	1769	1969
Minimum Clearance (mm)	500	700	700	800	800
Minimum Ceiling Height (mm)	1664	2064	2364	2569	2769
Weight empty (kg)	47	56	62	79	90
Max weight in service (kg)	60	150	180	325	390
Max Flow rate (l/min)	8	15	30	70	90
Backwash flow rate (l/min)	25	35	35	45	45
Inlet / Outlet Pipe Size	DN 20	DN 20	DN 20	DN 25	DN 40
Mains water / drain pipe size	DN 20	DN 20	DN 20	DN 25	DN 25
Pressure differential (kPa)	50	80	100	120	150

SIDE STREAM FLOW RATE

Filtration flow rate is based on achieving a turnover of 1 – 2 system volumes in 24 hours. Turnover is a better criteria for side stream flow than a percentage of bulk flow, the latter being dependant on the delta T of the system and ignoring thermal storage. Using a lower flow rate allows more efficient filtration at significantly reduced energy consumption.

CONNECTIONS

To achieve optimum water conditioning and to minimise water hardness in heating systems, units should be connected in the highest temperature area: **Flow on heating, Return on chilled.**

The preference is to provide two connections on the same pipe, using a dedicated circulation pump to deliver uniform flow rate, irrespective of system operating conditions. There is no strict minimum distance between these connections, but a guide of 300mm is commonly employed.

Units can be connected across system pumps, using differential pressure to generate the side stream flow. This is suitable only where system pumps are in the correct temperature area, run continuously and at constant differential pressure exceeding that shown in the Installation Data table.

Fluid Category 4 or 5 approved air-break type back flow protection is required for the mains water supply that connects to the EM unit. ENWA supply break tanks designed to deliver the correct flow rate and pressure to effectively backwash the EM models. The break tank assembly incorporates a submersible booster pump to ensure effective flow rates, even where mains water pressure is low. Site drains must be able to cope with the backwash flow rates detailed in the Installation Data table.

One break tank can serve multiple EM units if located in a common plant area. The project design may incorporate a common Cat 4 or 5 device which can be employed. The device must be capable of supplying the stated backwash flow rate for up to 10 minutes. Multiple units would be programmed to backwash at different times / days.

Refer to EnwaMatic Installation Manual

NEW BUILDS

EnwaMatic units provide the complete filtration requirements for closed systems, as a direct alternative to in-line dirt & air separators, cyclones and cartridge type filters. Filtration by media bed removes all particles to < 10 microns, irrespective of density. This is preferable on new builds where suspended solids post chemical cleaning and flushing contain less of the larger, dense Iron Oxide particles and an increased proportion of light or neutral buoyancy materials.

EnwaMatic units are a direct alternative to traditional chemical inhibitors and provide a self-regulating water conditioning process based on pH regulation. **Please refer to the start-up strategy** at the end of this document for the recommended procedure post chemical cleaning.

Use of side stream filtration on new builds can significantly reduce the quantity of flushing water required.

Effective water treatment facilitates the commissioning process and assists in successful project handover.

REFURBISHMENT AND RETROFIT

EnwaMatic units are ideal for refurbishment and retrofit projects, offering a safe, non-intrusive and non-scouring alternative to chemical cleaning and flushing. The self-regulating conditioning process provides long term protection for both newly installed and existing components.

The side stream configuration is simple to install using existing connections or live 'tap-ins'. No disruption to system operation.

A condition survey including analysis of water chemistry, current operating issues and records of previous chemical treatments can be undertaken by ENWA to ensure suitability of the EnwaMatic process and to advise on installation.

MAKE-UP WATER IN CLOSED SYSTEMS

Most systems are not 100% sealed and the EnwaMatic process can accommodate reasonable levels of water exchange. It is important that the client is aware of the extent of 'make-up' to their closed loop systems and we would recommend installation of a water meter for the pressurisation unit.

For MTHW applications, or where the specification or equipment warranties require very low hardness levels, filling with softened water is advised.

BACTERIAL CONTROL

The EnwaMatic treatment process reduces the potential for bacterial growth by addressing key environmental factors. Elevation of pH, removal of fine nutrients or substrate materials, helping to maintain correct temperature / flow profiles and reduced chemical dosing all play a role. This can compliment biocide dosing in more problematic systems with rising trends in bacteria levels.

LIMITATIONS

Specifiers should contact ENWA prior to specification of the EnwaMatic® for HVAC systems that are known to contain **Aluminium components**. Enwa Filter Only (EFO) units can be used on these applications.

No application for standard EnwaMatic units with open systems, cooling towers or steam raising plant.

PAYBACK

In general, our clients see savings in the following areas:

- Reduced use of chemicals, their associated contract costs and potential for future cleaning / flushing requirements.
- Reduced reactive maintenance costs.
- Improved HVAC system control and reliability.
- Increased component and system lifespan
- Maintaining the design efficiency of the system

START-UP STRATEGY

Retro-fit installation of Enwamatic units to existing systems:

In most cases, Enwamatic EM / EFO units can be commissioned directly on existing systems without prior water treatment, cleaning or flushing. Dynamic flushing can be employed on heavily contaminated systems to help clear larger debris, blocked components and low flow areas. System strainers should be checked and cleared to ensure effective flow rates in all areas.

Please inform ENWA before undertaking any chemical dosing and provide data sheets for comment.

Refurbishment projects:

Where new plant such as boilers, chillers or heat exchangers are added to an existing system, it is beneficial to commission the EnwaMatic unit first, allowing time to clean the system and establish a protective water chemistry. Where this is not possible, commission the EnwaMatic unit as soon as possible and consider bypassing key plant if the initial water quality is poor.

Where extensive new pipework has been installed, or chemical cleaning employed, the 'New Build' strategy should be observed.

New build projects:

In general, new build systems will be filled, cleaned and flushed in accordance with BSRIA guidelines. There is therefore a requirement to provide immediate corrosion protection (passivation) prior to the ENWA unit being commissioned and established.

ENWA advise a 'start-up' passivating dose of a Synergised Nitrite or similar Nitrite based inhibitor. Alternative products that also provide an initial pH rise to > 9.0 may also be considered. Molybdate based inhibitors designed for neutral pH are less effective for initial passivation and less suitable for pre-treatment. **Products that actively buffer against pH increase should not be used.**

ENWA recommend an initial biocide wash for chilled water and condenser systems. A strategy for the monitoring and control of bacteria levels compliant with current BSRIA guidelines should be implemented. This should include anti-stagnation controls to ensure regular turnover of all areas of the system.

Please forward data sheets for all proposed dosing to ENWA for comment.

Enwa Filter Only EFO applications:

These units provide side stream filtration and air separation only and are typically employed on systems with aluminium components or where pH elevation is not suitable. Corrosion inhibitors suitable for the system metals and required pH range must be employed.

For more information on any aspect, please contact ENWA:

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