

Nutrient Neutrality Statement

River Avon SAC - Phosphorus

Conversion of Hillside Stables to Holiday Accommodation

Hillside Stables, Hill Road, Sutton Veny,
Wiltshire, BA12 7AT



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Shortlisted

1. Introduction

- 1.1 This Nutrient Neutrality Statement has been prepared by Lone Wolf Planning Ltd on behalf of Joelle Griffin in support of a planning application for the conversion of Hillside Stables, Hill Road, Sutton Veny, to a two-bedroom unit of holiday accommodation.
- 1.2 The application site lies within the catchment of the internationally protected River Avon Special Area of Conservation (SAC), where additional phosphorus loading from qualifying development must be addressed through the nutrient neutrality assessment process.
- 1.3 The purpose of this Statement is to demonstrate a clear and deliverable phosphorus mitigation strategy so that the proposed holiday accommodation can be nutrient neutral in relation to the River Avon SAC. The site is also shown by Wiltshire Council as lying within the Salisbury Plain SPA Mitigation Zone; that is a separate recreational-impact matter and is not part of the phosphorus budget addressed in this Statement.

2. Policy and Assessment Framework

- 2.1 Regulation 63 of the Conservation of Habitats and Species Regulations 2017 requires the competent authority to undertake an Appropriate Assessment where a proposal is likely to have a significant effect upon a habitats site. National Planning Policy Framework Policy N6(1)(a)(i) similarly provides that development affecting a site of international importance should only proceed where an Appropriate Assessment concludes that the proposal will not adversely affect the integrity of the site.
- 2.2 The phosphorus budget has been prepared using the Natural England Nutrient Neutrality Budget Calculator for the River Avon SAC, Version 03.01.6. The calculator expressly allows a user-defined package treatment plant to be selected where the manufacturer specifies a certified final effluent concentration for total phosphorus (TP), with that certified value entered into the calculator.

3. Wastewater Treatment Strategy

- 3.1 The development will use a private package wastewater treatment system comprising a Marsh Ensign Range EL package sewage treatment plant followed by a Marsh MI Phos-Lite tertiary phosphate reduction unit. The units will be appropriately sized and installed in accordance with the manufacturer's requirements.
- 3.2 The evidential chain for the manufacturer-specific phosphorus figure is clear. British Water lists the Ensign Range EL under EN 12566 Part 3 and separately lists the MI Phos-Lite under EN 12566 Part 7, with phosphorus performance information available for both systems. The Ensign:EL certificate records a base-plant P_{tot} effluent concentration of 5.4 mg/l.
- 3.3 The MI Phos-Lite has separate PIA certification under EN 12566-7:2013, Annex A. Certificate No. 469.01C1 records a P_{tot} treatment efficiency of 95.9% and a final effluent concentration of 0.2 mg/l P_{tot}. Marsh Industries' nutrient-neutrality technical document expressly confirms that the test result achieved when the Phos-Lite is combined with the Marsh Ensign:EL is 0.2 mg/l P_{tot}.



- 3.4 Accordingly, the Natural England calculator has been completed using “Package Treatment Plant user defined” and a certified TP concentration of 0.2 mg/l. This figure is not an assumed performance rate: it is supported by the separately certified tertiary treatment unit and the manufacturer’s combined-system test evidence.
- 3.5 The treatment plant and Phos-Lite media will be maintained for the lifetime of the development in accordance with the manufacturer’s servicing, monitoring and media-replacement requirements. This can be secured by an appropriately worded planning condition and/or the mechanism used to secure nutrient mitigation.

4. Nutrient Budget

- 4.1 The completed River Avon calculator uses the following principal assumptions: one unit; first occupancy from 1 January 2027; the calculator default average occupancy of 2.4 persons per unit; water use of 120 litres per person per day; and a 0.05 ha application site. The same 0.05 ha land-cover area is recorded before and after development, producing no net land-use phosphorus change.
- 4.2 Using the certified 0.2 mg/l P_{tot} value, the calculator generates a wastewater TP load of 0.02 kg TP/year. The net land-use change is 0.00 kg TP/year. The calculator then applies its 20% precautionary buffer and reports a final annual phosphorus load to mitigate of 0.02 kg TP/year.
- 4.3 The residual 0.02 kg TP/year will be mitigated through Wiltshire Council’s approved phosphorus credit scheme, subject to availability and completion of the Council’s required legal mechanism. The submitted nutrient calculator therefore identifies a defined and quantifiable residual requirement for which an established mitigation route is available.

5. Conclusion

- 5.1 The proposed off-mains drainage solution substantially reduces the phosphorus loading associated with the holiday accommodation by combining a certified Ensign:EL package treatment plant with a separately certified MI Phos-Lite tertiary phosphate reduction unit. The manufacturer’s evidence supports a final effluent concentration of 0.2 mg/l P_{tot} for that combined arrangement.
- 5.2 On the assumptions entered into the Natural England River Avon calculator, the resulting residual mitigation requirement is 0.02 kg TP/year after application of the calculator’s precautionary buffer. That residual will be fully addressed through Wiltshire Council phosphorus credits.
- 5.3 Subject to securing the treatment specification, its ongoing maintenance and the identified phosphorus credits, the proposed development will be nutrient neutral. There is therefore a clear basis for the competent authority to conclude, through Appropriate Assessment, that the proposal will not adversely affect the integrity of the River Avon SAC as a consequence of additional phosphorus loading.



6. Evidence Relied Upon

- 6.1 Natural England, Nutrient Neutrality Budget Calculator for the River Avon SAC, Version 03.01.6 (completed project calculator).
- 6.2 British Water, List of Certified Small Wastewater Treatment Systems Up to 50PT: Ensign Range EL (EN 12566-3) and MI Phos-Lite (EN 12566-7).
- 6.3 PIA GmbH, Certificate 408.01C01, Marsh Ensign Range EL, August 2022.
- 6.4 PIA GmbH, Certificate 469.01C1, Marsh MI Phos-Lite, September 2024.
- 6.5 Marsh Industries, *Phosphate and Nitrate Reduction from Marsh Industries*, Technical Document MI/NE2025.



Natural England Nutrient Neutrality budget calculator for the River Avon SAC	
This calculator was created by Ricardo Energy and Environment.	
This calculator contains 6 worksheets with 9 tables in total.	
This is the instructions cover sheet. It tells you how to use the calculator and gives an overview of each worksheet.	
You can move between worksheets using the tabs at the bottom of the page.	
If you use screen reading software, you can use 'Ctrl' + 'Page Down' keys to move between the tabs.	
If you use a keyboard only, to open any link in this form first select the cell with the link and then press the 'Shift' + 'F10' keys or the 'F9' + the 'Menu' keys, then press the letter 'D' twice to highlight 'Open Hyperlink' and press 'Enter'.	
If you use a keyboard only, access dropdown lists by clicking the dropdown arrow or pressing the 'Alt' + 'Down' keys when the cell is selected.	
Table of contents	
Topic of each table	Link to each worksheet
Worksheet 1 Nutrient loading from additional wastewater	Nutrients from wastewater
Worksheet 2 Nutrient loading from current land use	Nutrients from current land use
Worksheet 3 Nutrient loading from future land use	Nutrients from future land use
Worksheet 4 Nutrient loading from future land use after treatment through a sustainable urban drainage system (SuDS)	SuDS
Worksheet 5 Nutrient budget calculations	Final nutrient budgets
General information about the calculator	
This calculator helps you calculate the nutrient budget for a new residential development.	
The nutrient budget for a site is calculated in 4 key stages with an additional optional stage in which information about the SuDS features on the site can be entered. Each stage is implemented in worksheets 1-5 of this calculator.	
Each worksheet is connected through a set of formulas which calculate the nutrient budget. As such, all sheets which represent the four key stages require data inputs in order to calculate the nutrient budget.	
The total nutrient budget is calculated automatically by adding the values from the 'Nutrients from wastewater' and the outputs from the 'Nutrients from future land use' minus the 'SuDS' (if applicable), and then subtracting the values from the 'Nutrients from current land use', then adding a 20% precautionary buffer to the result. This calculation is completed in the 'Final nutrient budgets' worksheet.	
Before a nutrient budget can be completed using the methodology, certain site-specific details for the development site need to be determined.	
The guidance in this calculator gives further information on the user inputs required.	
The instructions for completing each stage of the nutrient budget methodology are shown in cell A2 of each worksheet.	
This calculator uses a set of lookup tables to find relevant values in a hidden spreadsheet titled the 'Value look up tables' worksheet.	
It is advisable to retain a blank copy of this calculator and 'Save as' a new copy each time you calculate a budget to minimise the risk of using incorrect data inputs and to ease the calculation of new nutrient budgets.	
The values already included have been chosen based on research to determine suitable inputs to the nutrient budget that meet the	
If editing any values in this calculator, you must make sure there is a sufficient evidence base to justify these changes and that the new inputs are selected in accordance with the precautionary principle.	
Notes about the nutrients from wastewater worksheet	
This sheet contains 2 tables.	
The table under the heading 'Water infrastructure information' allows the user to enter key information about the wastewater generated and water infrastructure on the site. This table contains a mix of user specified values and values that are calculated automatically depending on the user selected inputs.	
The date of first occupancy is required because some wastewater treatment works (WwTW) may be due an upgrade in 2025 or 2030 which will change the nutrient concentration permit values. This will be shown through 2 or 3 values for the permits and nutrients load from before and after the upgrade.	
The amount of wastewater generated as a result of the population needs to be calculated using the following: - an average occupancy rate - a per capita water usage figure - the number of new developments	
The default water usage value is preset in the worksheet. The default setting for the average occupancy rate is preset in the worksheet and is the national occupancy rate of 2.4 people per dwelling or unit. Only change this value if there is sufficient evidence that the development will be different to the national average. The number of new developments is not preset and must be a whole number.	
If it is uncertain what WwTW the development will drain into, find this information from your sewerage company before completing the calculator. If it is not feasible to connect to a WwTW and a septic tank or package treatment plant is being used, select this option.	
If the total phosphorus (TP) final effluent concentrations (in mg/l) are specified by the manufacturer, select 'Septic Tank user defined' or 'Package Treatment Plant user defined' and enter the manufacturer specified value in the cell where prompted.	
The table under the heading 'Final calculation of nutrient load from wastewater' contains the calculation of the nutrient load from additional wastewater. This table may present up to 3 different values for the nutrient load.	
If a nutrient permit is changing for the selected WwTW as of 01/01/2025, or 01/04/2030, the table will be broken down into up to 3 parts: - post-2030 wastewater nutrient loading - pre-2030 wastewater nutrient loading - pre-2025 wastewater nutrient loading	
If applicable, 3 nutrient budgets will be calculated for the loading before and after the 2030 and 2025 WwTW permit upgrades, and will be presented in cells B18, B20 or B22.	
Notes about the nutrients from current land use worksheet	
This worksheet contains two tables that are used for calculating the annual nutrient load from existing (pre development) land use on the development site. Environmental information about the current site is required for the first table. The second table requires the user to input the existing type(s) and area(s) of landcover present in order to generate nutrient loads associated with the current landcovers on the site. Only landcovers for the land that is being altered by the development should be entered.	
The dropdown list of landcover types contains up to 8 agricultural landcover types and 8 different non-agricultural landcover types.	
The calculator guidance gives further information about the landcover types used.	
Sources of information required for nutrients from current land use worksheet	
Description of the information:	
The operational catchment within which the development is located can be found using the Environment Agency Catchment Data E	
The drainage associated with the predominant soil type within the development site can be found using the SoilsCapes Map	
The annual average rainfall that the development will receive can be found using the National River Flow Archive for the '43021 - Av	
Whether the development is located within a nitrate vulnerable zone (NVZ) can be found using the UK Soil Observatory 'Nitrate Vulnerable Zones - England' map	
Notes about the nutrients from future land use worksheet	
This worksheet contains one table which is used to calculate the annual nutrient load from new (post-development) land use on the development site. The type(s) and area(s) of landcover present on the new development is required to generate nutrient loads associated with the current landcovers on the site.	
The type(s) of landcover present on the new development site can be selected from a list of 8 different landcover types: - greenspace - woodland - shrub - water - residential urban land - commercial or industrial urban land - open urban land - community food growing	
Find out what landcover types will be within the development site before completing this table. If there is a landcover within the development site that is not in the list select the most similar landcover type.	
The calculator guidance gives further information about the landcover types used in this calculator.	
Notes about the SuDS worksheet	
This worksheet contains one table in which the user can enter key information about the use of SuDS to treat the runoff from the site and reduce the nutrient loading from future land uses.	
The table allows the user to enter the SuDS features or SuDS management trains that are proposed to treat the nutrient loading from future land uses. The land covers within the SuDS catchment area and the areas of these landcovers can be entered. Only landcovers entered into the 'Nutrients from future land use' worksheet can be selected. The nutrient loads associated with these landcovers are automatically calculated using the values from the worksheet 'Nutrients from future land use'.	
The user must enter the percentage of flow that will be directed through the SuDS. Any numerical value less than or equal to 100% can be entered for the percentage of flow.	
Any numerical value less than or equal to 100% can be entered for the removal rates. However, the user will be required to present all evidence of these removal rates to the competent authority. As such, the most up to date SuDS guidance on SuDS for nutrient removal should be followed.	
The user can enter any text for the SuDS feature to allow for variability in the names of the SuDS features or management trains planned.	
Notes about the final nutrient budgets	
This final stage automatically calculates the results from worksheets 1-5.	
The value(s) shown represent the nutrient mitigation required in kilograms per year to achieve nutrient neutrality.	
If there are 2 or 3 values due to changing permits, the calculator will show the total amount of nutrient mitigation that is needed before and after the changing permit date.	

Nutrients from wastewater		
This sheet contains 2 tables. The tables are separated by a heading, which describes the following table. Note: You will need to fill in cells B5 to B9 in the first table 'Water infrastructure information'. Cells B10 is automatically calculated and will state '0.00' unless the user inputs have been entered. Cells A11 to A12 and B11 to B12 are automatically generated and will state 'Not applicable' depending on the inputs to cells B5 and B9. You may need to fill in cell C10 depending on the information you entered in cell B9. Cells C5 to C9 and cells C11 to C12 are intentionally blank cells. You do not need to fill in any cells in the second table 'Final calculation of nutrient load from wastewater'. Cells B16 to B18 are automatically calculated and will state '0.00' unless the user inputs have been entered to the first table 'Water infrastructure information'. Cells A19 to A22, cells B20 and B22 are automatically generated and will state 'Not applicable' depending on the user inputs to the first table 'Water infrastructure information'. Cell B15, cell B19 and cell B21 are intentionally blank cells. How to fill in the table 'Water infrastructure information' Cell B5: Enter the date of first occupancy. Cell B6: Enter the average occupancy rate of the development. The default rate is 2.4, this should not be edited without sufficient evidence. Cell B7: Enter the water usage. This value should be kept at 120 unless other efficiency measures are used. Cell B8: Enter the total number of dwellings or units that will be within the development site as of the project completion date. Cell B9: Choose the receiving wastewater treatment works (WwTW) from the dropdown list. If you select 'Package Treatment Plant user defined' or 'Septic Tank user defined', you must enter their certified value of total phosphorus (TP) in cell C10. Otherwise the default values will be used in the calculation of the nutrient load associated with wastewater. Nutrient permits may be changing for the WwTW you select, from 01/01/2025, or 01/04/2030. If the date of first occupancy is in-between changing permit dates, multiple permit limits may be automatically generated in cells B10 to B12. If applicable, up to 3 values for the nutrient loading associated with wastewater will be presented in cell B18, B20 or B22.		
Water infrastructure information		
Description of required information	Data entry column - user inputs required	Additional data entry column - user inputs may be required
Date of first occupancy (dd/mm/yyyy):	1/1/2027	
Average occupancy rate (people/dwelling or people/unit):	2.40	
Water usage (litres/person/day):	120	
Development proposal (dwellings/units):	1	
Wastewater treatment works:	Package Treatment Plant user defined	
Current wastewater treatment works P permit (mg TP/litre):	Enter value in cell C10	0.2
Not applicable	Not applicable	
Not applicable	Not applicable	
Final calculation of nutrient load from wastewater		
Description of values generated	Values generated	
Wastewater nutrient loading		
Additional population (people):	2.40	
Wastewater by development (litres/day):	288.00	
Annual wastewater TP load (kg TP/yr):	0.02	
Not applicable		
Not applicable	Not applicable	
Not applicable		
Not applicable	Not applicable	

Nutrients from current land use

This sheet contains 2 tables. The tables are separated by a heading, which describes the following table.

Note: You will need to fill in cells B5 to B8 in the first table 'Current land use information'. You will need to fill in cells A11 to A27, and B11 to B27 in the second table 'Current land uses'. Cells C8, B11 to C21 are automatically calculated and will state '0.00' unless the user inputs have been entered. Cells D11 to D27 are automatically generated and will state 'Not available'. The 'Total Row' (row 28) is automatically generated and will state 'Total'. The 'Total Row' states 'Totals': in cell A28 and automatically calculates the total sum of cells B11 to B27 in cell B28 and B11 to C27 in cell C28. Cell D28 is intentionally blank.

How to fill in the table 'Current land use information':

Cell A5: Fill in the number of the type of land use that is located within from the dropdown list.

Cell B5: Choose the soil drainage type associated with the predominant soil type within the development site from the dropdown list.

Cell C5: Choose the type of development that the development will receive from the dropdown list.

Cell D5: Choose whether the development is in a nitrate vulnerable zone (NVZ) from the dropdown list.

How to fill in the table 'Current land uses and types':

Cell A11-A27: Choose the existing (pre-development) land use type(s) from the dropdown list.

Cells B11-B27: Enter the area in hectares of each land use type.

Cells C11-C27: Enter the area in hectares shown in cells C11-C27 for total phosphorus (TP).

The total nutrient load from current land uses is shown in cell D28 for TP.

Current land use information

Description of required information	Data entry column - user inputs required
Operational catchment:	Avon Hampshire
Soil drainage type:	Freely draining
Annual average rainfall (mm):	850.1 - 900
Within nitrate vulnerable zone (NVZ):	Yes

Current land uses

Existing land use type(s) - user inputs required	Area (ha) - user inputs required	Annual phosphorus export (kg TP/yr)	Notes on data
Residential urban land	0.05	0.09	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
		0.00	Not applicable
Totals:	0.05	0.09	

Nutrients from future land use		
This sheet contains one table. Note: You will need to fill in cells A5 to A21 and B5 to B21. Cells B22 and C5 to C22 are automatically generated calculations and will state '0.00' unless the user inputs have been entered. Row 22 is a Total Row. The Total Row states 'Totals:' in cell A22 and automatically calculates the total sum of cells B5 to B21 in cell B22 and C5 to C21 in cell C22. How to fill in the table 'Future land uses' Cells A5-A21: Choose the future (post-development) land use type(s) of landcover present on the new site from the dropdown list Cells B5-B21: Enter the area in hectares of each land use type. The nutrient load from future land uses is shown in cells C5 to C21 for total phosphorus (TP). The total nutrient load from future land uses is shown in cell C22 for TP.		
Future land uses		
New land use type(s) - user inputs required	Area (ha) - user inputs required	Annual phosphorus export (kg TP/yr)
Residential urban land	0.05	0.09
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
		0.00
Totals:	0.05	0.09

Nutrients from future land use after sustainable urban drainage system (SuDS) treatment

This sheet contains one table.

Note: You will need to fill in cells A5 to A29, cells B5 to B29, cells C5 to C29, cells E5 to E29 and cells F5 to F29 if you are including SuDS to remove nutrients from the surface runoff. Cells B30, D5 to D30 and cells G5 to G30 are automatically calculated and will state 0.00 unless the user inputs have been entered. Cells H5 to H29 are automatically generated and will state 'Not applicable' unless the total area of the landcover entered is larger than the total area of the landcover entered into the worksheet.

Nutrients from Urban land use: Row 30 is the total row. The total row's entries: 'Totals': in cell A30 and automatically calculates the total sum of cells B5 to B29 in cell B30, cells D5 to D29 in cell D30 and cells G5 to G29 in cell G30. Cell C30, cell E30, cell F30 and cell H30 are irrelevant cells to Urban.

How to fill in the table 'SuDS information'

Cells A5 to A29: Choose the future (post-development) land use type(s) of landcover present on the new site within the SuDS catchment area from the dropdown list. Only landcovers entered into the worksheet titled 'Nutrients_from_future_land_use' can be entered.

Cells C5 to C29: Enter the percentage of the flow entering the SuDS feature. If all flow is being diverted to the SuDS feature then this value should be 100.

The annual total phosphorus (TP) loads associated with the landcovers in the SuDS catchment area are automatically calculated in cells 05 to 029

Cells E5 to E29: Enter the name of the SuDS features used to intercept surface flows can be entered in. Any text can be entered into these cells.

Values for column F must be identified by the user and must be specific to the SuDS features being implemented.

The annual TP load removed by the SuDS features are automatically calculated in cells G5 to G29. These values are subtracted from the nutrient budget.

You do not need to fill in column H "Notes on data". It will state "Not applicable" unless the total area of each landcover within the SubS catchment area exceeds the area of the landcovers entered into the worksheet titled "Nutrients_from_future_land_use".

SuDS information

How land use type(s) within SuDS catchment area - user inputs required	SuDS catchment area (ha) - user inputs required	Percentage of flow inputs to SuDS requiring	Annual phosphorus entering the SuDS (kg) - user inputs required	Name of SuDS feature(s) - user inputs required	TP removal rate for features - user specified (%) - user inputs required	Annual phosphorus load removed by SuDS (kg TP/y)	Notes on data
Residential urban land			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
			0.00			0.00	Not applicable
Totals:	0.00	0.00	0.00			0.00	

Final nutrient budgets	
This worksheet contains one table. This table is automatically populated using the outputs from the previous worksheets. Note: You do not need to fill in any cells in the table. Cells B5 to B8 and cells B10 are automatically calculated and will state '0.00' unless the user inputs have been entered to all of the required worksheets. Cells A11 to A14, cell B12 and cell B14 are automatically generated and will state 'Not applicable' depending on the user inputs to the worksheet 'Nutrients from wastewater'. Cell B9, B11 and B13 are intentionally blank. This table presents calculations that underpin the final annual nutrient budget for the development site. Up to 3 values for the nutrient budget may be presented in cells B10, B12 and B24 for total phosphorus (TP).	
Total nutrient budget calculations	
Description of values generated	Values generated
Wastewater TP load (kg TP/year):	0.02
Net land use TP change (kg TP/year):	0.00
TP budget:	0.02
TP budget + 20% buffer:	0.02
Annual nutrient budget	
The total annual phosphorus load to mitigate is (kg TP/yr):	0.02
Not applicable	
Not applicable	Not applicable
Not applicable	
Not applicable	Not applicable

[CONTACT US \(HTTPS://WWW.BRITISHWATER.CO.UK/GENERAL/?TYPE=CONTACT\)](https://www.britishwater.co.uk/general/?type=contact)

[SIGN IN \(HTTPS://WWW.BRITISHWATER.CO.UK/LOGIN.ASPX\)](https://www.britishwater.co.uk/login.aspx)

English

[in \(https://www.linkedin.com/company/britishwater\)](https://www.linkedin.com/company/britishwater) [yt \(https://www.youtube.com/channel/UC1SHVSTERW0WkF6GK9ALnR4p50e5f4ritishwater\)](https://www.youtube.com/channel/UC1SHVSTERW0WkF6GK9ALnR4p50e5f4ritishwater)



MENU

List of Certified Small Wastewater Treatment Systems Up to 50PT

The General binding rules: small sewage discharge to the ground
(<https://www.gov.uk/permits-you-need-for-septic-tanks/general-binding-rules>) set that:

English

Your treatment system must meet the right British Standard

Your treatment system must meet the relevant British Standard in force at the time of installation. The standards currently in force for new systems are:

- BS EN 12566 for septic tanks and small sewage treatment plants
- BS 6297:2007 for drainage fields

British Water has made all reasonable efforts to collect all the current certified equipment and to ensure that the information provided in the following table is correct. The information is based on certificates provided by the manufacturers which, where possible, have been cross-checked with lists on Test House websites. British Water does not accept any liability for the accuracy of this information .

If the product that you are seeking is not on the list, please ensure with the manufacturer that it has the required: CE/UKCA marking and that the manual or other documentation that came with your tank or treatment plant has a certificate of compliance with a British Standard.

EN 12566-Part 1"Part 1: Prefabricated septic tanks"

Product Brand	Product Model Range	Company	British Water Member	Certification Link
Euro Septic Tank with filter	Spherical Range	Marsh Industries	Yes	Link (https://www.britishwater.co.uk ,
Euro Septic Tank no filter	Range 2800L-4500L	Marsh Industries	Yes	Link (https://www.britishwater.co.uk ,
Green Filter Septic Tank	Range 2800L-6000L	Marsh Industries	Yes	Link (https://www.britishwater.co.uk ,
EN Septic Tank	Range 2800L-6000L	Marsh Industries	Yes	Link (https://www.britishwater.co.uk ,
5 Filter Intelligent Septic	Range 2800L-4700L	Marsh Industries	Yes	Link (https://www.britishwater.co.uk ,

Euro Cylindrical Shallow Septic	Range 2800L-20000L	Marsh Industries	Yes	Link (https://www.britishwater.co.uk , English)
Anaerobix Septic	4-88 person dwellings	Graf	No	Link (https://www.britishwater.co.uk ,
Harlequin Septic Tank	5-22 person	Harlequin	Yes	Link (https://www.britishwater.co.uk ,
Klargester Alpha Septic Tank	5-17 person	Kingspan Water & Energy Ltd	Yes	Link (https://www.britishwater.co.uk ,
Klargester Gamma Septic Tank	5-13 person	Kingspan Water & Energy Ltd	Yes	Link (https://www.britishwater.co.uk ,
Klargester Sigma Septic Tank	5-47 person	Kingspan Water & Energy Ltd	Yes	Link (https://www.britishwater.co.uk ,
Tricel Vento Septic Tank	6 to 20 PE	Tricel	Yes	Link (https://www.britishwater.co.uk ,
Synergy Robusta Low Profile	from 4 to 16 PE	Synergy Wastewater Treatment Products	No	Link (https://www.britishwater.co.uk/1_cert._synergy_robu.pdf)
Oaks Town Septic Tank		O'Reilly Oaks Town Environmental Ltd	No	Link (https://www.britishwater.co.uk/1_septi.pdf)
Synergy Spherical (Onion) Septic Tank	Range 2800L-4600L	Synergy Wastewater Treatment Products Ltd	No	Link (https://www.britishwater.co.uk/reso
Rewatec Septic Tank	3-15 m3	Premier Tech Water and Environment	Yes	Link (https://www.britishwater.co.uk/premier_tech_aqua_uk/millennium_pr

EN 12566 - Part 3 "Part 3: Packaged and/or site assembled domestic wastewater treatment plants"

Product Brand	Product Model Range	Company	British Water Member	Certification Link	
				English	
UP-L Ultra Polylok	6PE-50PE	Marsh Industries	Yes	Link (https://www.britishwat	
The Ensign Range Sewage Plants	6PE-50PE	Marsh Industries	Yes	Link (https://www.britishwat	
The Ensign Range EL	up to 50 PT	Marsh Industries	Yes	Link (https://www.britishwat	
Clenviro Matrix	CLF1 (6pe) to CLF7 (50pe)	Clenviro Ltd	Yes	Link (https://www.britishwat	
Matrix Topas Plus	7pe - 500pe	Clenviro Ltd	Yes	Link (https://www.britishwat	
Biocell QuickOne+	4-50 person	Biocell Water	No	Link (https://www.britishwat	
ClearFox Nature	4-50 person	Biocell Water	No	Link (https://www.britishwat	
Biocell Concrete SBR	4-1000 person	Biocell Water	No	Link (https://www.britishwat	
Biocell Concrete FBS	4-500 person	Biocell Water	No	Link (https://www.britishwat	
Biocell GRP SBR	4-500 person	TEC Ltd	No	Link (https://www.britishwat	
Biocell GRP FBS	4-500 person	TEC Ltd	No	Link (https://www.britishwat	
Diamond DMS 2	up to 50 PT	WCS Environmental Engineering	Yes	Link (https://www.britishwat	
Diamond DMS 5	up to 50 PT	WCS Environmental Engineering	Yes	Link (https://www.britishwat	
HiPAF®	up to 50 PT	WCS Environmental Engineering	Yes	Link (https://www.britishwat	
Rewatec ASP Sewage Treatment Plant	up to 50 PT	Premier Tech Water and Environment	Yes	Link (https://www.britishwat_asp_06.pdf)	

Rewatec SAF Sewage Treatment Plant	up to 50 PT	Premier Tech Water and Environment	Yes	Link (https://www.britishwat
English				
Ecoflo Biofilter	up to 50 PT	Premier Tech Water and Environment	Yes	Link (https://www.britishwat
Rewatec Solido SMART SBR Sewage Treatment Plant	up to 50 PT	Premier Tech Water and Environment	Yes	Link (https://www.britishwat premier_tech_aqua_uk/rewa
Turley Precast Concrete SBR	8 -1000 Person	Turley Bros	No	Link (https://www.britishwat
VORTEX	1-30PE	WTE	No	Link (https://www.britishwat
FILTERPOD S	1-5PE	WTE	No	Link (https://www.britishwat
FILTERPOD K	1-20PE	WTE	No	Link (https://www.britishwat
FALCON	up to 50PT	WTE	No	Link (https://www.britishwat
APEX	up to 50PT	WTE	No	Link (https://www.britishwat
CYCLONE	up to 50PT	WTE	No	Link (https://www.britishwat
QUANTUM	up to 50PT	WTE	No	Link (https://www.britishwat
Bio-Pure	1 - 55 person	We Build It Limited	Yes	Link (https://www.britishwat
Small wastewater treatment Portapura	up to 50 PT	Portapura Limited	No	Link (https://www.britishwat
Small wastewater treatment system MATRIX CLF	up to 50 PT	Clenviro Ltd	Yes	Link (https://www.britishwat
Small wastewater treatment system oneAdvanced	5-50 person dwellings	Graf	No	Link (https://www.british

Small wastewater treatment system oneAdvanced with +P phosphate reduction package	5-50 person dwellings	Graf	No	Link (https://www.britishwater.co.uk/Products/Small-Wastewater-Treatment-Systems/Advanced-1P-50PE-System)
Small wastewater treatment system one2clean Xtra+P	5-50 person dwellings	Graf	No	Link (https://www.britishwater.co.uk/Products/Small-Wastewater-Treatment-Systems/2clean-Xtra-50PE-System)
Small wastewater treatment system one2clean	5-50 person dwellings	Graf	No	Link (https://www.britishwater.co.uk/Products/Small-Wastewater-Treatment-Systems/2clean-50PE-System)
Harlequin Hydroclear	6-50PE	Harlequin	Yes	Link (https://www.britishwater.co.uk/Products/Small-Wastewater-Treatment-Systems/Harlequin-Hydroclear)
Harlequin CAP	6-50PE	Harlequin	Yes	Link (https://www.britishwater.co.uk/Products/Small-Wastewater-Treatment-Systems/Harlequin-CAP)
Klargester BioDisc® Domestic Sewage Treatment Plant	up to 50 population	Kingspan Water & Energy Ltd	Yes	Link (https://www.britishwater.co.uk/Products/Small-Wastewater-Treatment-Systems/Klargester-BioDisc-Domestic-Sewage-Treatment-Plant)
Klargester Reed beds	6-12 population	Kingspan Water & Energy Ltd	Yes	Link (https://www.britishwater.co.uk/Products/Small-Wastewater-Treatment-Systems/Klargester-Reed-Beds)
Klargester BioDisc® + P Domestic Sewage Treatment Plant	up to 50	Kingspan Water & Energy Ltd	Yes	Link (https://www.britishwater.co.uk/Products/Small-Wastewater-Treatment-Systems/Klargester-BioDisc-Plus-P-Domestic-Sewage-Treatment-Plant)
BioDisc N-Range	up to 50	Kingspan Water & Energy Ltd	Yes	Link (https://www.britishwater.co.uk/Products/Small-Wastewater-Treatment-Systems/BioDisc-N-Range)
Klargester Biotec+	6PE-50PE	Kingspan Water & Energy Ltd	Yes	Link (https://cdn.ymaws.com/britishwater.org.uk/publications/documents/2016/1/1/20160114_1200_Klargester-Biotec-50PE-System.pdf)
Clearwater BioAir	6PE-50PE	Kingspan Water & Energy Ltd	Yes	Link (https://cdn.ymaws.com/britishwater.org.uk/publications/documents/2016/1/1/20160114_1200_Clearwater-BioAir-50PE-System.pdf)
BioDisc N-Range + BioTreat	up to 50	Kingspan Water & Energy Ltd	Yes	Link (https://www.britishwater.co.uk/Products/Small-Wastewater-Treatment-Systems/BioDisc-N-Range-BioTreat)
BioDisc N-Range + P	up to 50	Kingspan Water & Energy Ltd	Yes	Link (https://www.britishwater.co.uk/Products/Small-Wastewater-Treatment-Systems/BioDisc-N-Range-Plus-P)

Tricel Novo Sewage Treatment Plant	6 to 50 PE	Tricel	Yes	Link (https://www.britishwat)
Rewatec Solido SMART +P	5 to 50 PE	Premier Tech Water and Environment	Yes	Link (https://www.britishwat)
August NH4PO Waste Water Treatment Plant	up to 50	Premier Water Solutions 10 Ltd	No	Link (https://www.britishwat)
Uni: Gem Star (STP)	up to 50	Marsh Industries	Yes	Link (https://www.britishwat)
Oakstown BAF	up to 50	O'Reilly Oaks Town Environmental Ltd	No	Link (https://www.britishwat)
CEN(A)	up to 50 PE	Fuji Clean Co.	Yes (Haigh Group)	Link (https://www.britishwat)
CEN(B)	up to 50 PE	Fuji Clean Co.	Yes (Haigh Group)	Link (https://www.britishwat)
BIO EASY FLOW	up to 50 PE	HABA RL	No	Link (https://www.britishwat)
ECOROCK	4 to 50 pe	BIOROCK Sewage Treatment Ltd	No	Link (https://www.britishwat)
MONOBLOCK	2 to 8 pe	BIOROCK Sewage Treatment Ltd	No	Link (https://www.britishwat)
Synergy Optima Sewage Treatment Plant	6PE-50PE	Synergy Wastewater Treatment Products Ltd	No	Link (https://www.britishwater.cc)
CRX II	6PE-50PE	Fuji Clean Co.	Yes (Haigh Group)	Link (https://www.britishwat)
OXTEC6	6PE-50PE	Viltra	No	Link (https://www.britishwat)
PPR Concrete Tanks	6PE-50PE	PPR Carlow Concrete Tanks	No	Link (https://www.britishwat)

English

MI Nutra-Lite

6PE-50PE

Marsh Industries
Limited

Yes

Link (<https://www.britishwat>

English

EN 12566 - SmallPart 6 "Part 6: Prefabricated treatment units for septic tank effluent"

Product Brand	Product Model Range	Company	British Water Member	Certification Link
FilterPod S	1-5PE	WTE	No	Link (https://www.britishwater.co.uk/resource/r
FilterPod K	1-20PE	WTE	No	Link (https://www.britishwater.co.uk/resource/r
Ecoflo Biofilter	up to 50 PT	Premier Tech Water and Environment	Yes	Link (https://www.britishwater.co.uk/resource/r part-6-.pdf)
Uni:Gem Star	up to 50 PT	Marsh Industries	Yes	Link (https://www.britishwater.co.uk/resource/r
Phytocube	up to 50 PT	Rietland bvba	No	(https://www.britishwater.co.uk/resource/ (https://www.britishwater.co.uk/resource/resmg
HydroPod	up to 50 PT	WTE	No	Link (https://www.britishwater.co.uk/resource/r

EN 12566 - Part 7 "Part 7: Prefabricated tertiary treatment units"

Product Brand	Product Model Range	Company	British Water Member	Certification Link
Advanced tertiary treatment filter Ecoflo Biofilter	up to 50 PT	Premier Tech Water and Environment	Yes	Link (https://www.britishwater.co.uk/resource/premier_tech_aqua_uk/advanc_1.pdf)
Small wastewater treatment system GEM APS	up to 50 PT	Marsh Industries	Yes	Link (https://www.britishwater.co.uk/resource/resm7-p_nh4-n_.pdf)

MI Phos-
Liteup to
50 PTMarsh
Industries
Limited

Yes

Link (<https://www.britishwater.co.uk/resource>)

English

NOTES**1. Septic Tank Conversion Units**

Septic tank with a separate secondary treatment unit approved under BS:EN12566 may be used to discharge treated sewage effluent to a watercourse without requiring an environmental permit, presuming that all the general binding rules are also complied with. In-tank retrofit kits can only be used if the operator first applies for and is granted an environmental permit.

2. Non-Electric Sewage Plants

There are a several non-electric sewage plants being introduced into the UK market, where these units require an additional primary chamber, please ensure that the primary chamber being supplied is the same both dimensionally and in volume capacity as the product that was tested for EN12566-3 certification, failure to do so could invalidate the certification process test

3. Nutrient Information

N_{tot} reported as N_{tot} , TN_b or TKN in the test report.

You May Also Be Interested In

**Liaison Meetings**

Find information on upcoming British Water liaison meetings, providing opportunities for members to engage with regulators, stakeholders and industry leaders.

(https://www.britishwater.co.uk/events/event_list.asp?Show=&Group=&Start=3%2F29%2F2021&End=&View=&Cid=22000)

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(<https://www.britishwater.co.uk/page/supplychainimpactsurveys>)

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English

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Certificate

408.01C01

Marsh Industries Limited

Head Office Addington Park Industrial Park, Little Addington NN14 4AS UK

EN 12566-3, Annex B

Small wastewater treatment systems for up to 50 PT

Small wastewater treatment system Ensign Range E L

Fluidised bed reactor system in a GRP tank

Test report PIA2022-408B25

Evaluation of the nominal sequences of the 38-week testing

Nominal organic daily load (influent)	0.30 kg BOD ₅ /d		
Nominal hydraulic daily load	0.9 m ³ /d		
Material	GRP		
Treatment efficiency		Efficiency	Effluent
	COD	92.2 %	63 mg/l
	BOD ₅	95.6 %	14 mg/l
	TN _b	53.5 %	28 mg/l
	NH ₄ -N	97.8 %	1.0 mg/l
	P _{tot}	28.7 %	5.4 mg/l
	SS	94.5 %	21 mg/l

Evaluation of the complete 38-week testing

Electrical consumption	1.9 kWh/d
Number of desludging	0

Tested by:

PIA – Prüfinstitut für Abwassertechnik GmbH

(PIA GmbH)

Hergenrather Weg 30

52074 Aachen, Germany

This document replaces neither the declaration of performance nor the CE marking.



Martina Wermter

August 2022



Notified Body
No.: 1739



Deutsche
Akkreditierungsstelle
D-PL-17712-01-00

Certificate

Nr. 469.01C1

MI Phos-Lite

Module for chemical-physical after-treatment of sewage, tested in combination by use of a gravity operated plant

Marsh Industries Limited

Units 3-13 Addington Park Industrial Est., NN14 4AS Northants, UK

EN 12566-7:2013, Annex A: Tertiary treatment efficiency test

Small wastewater treatment systems for up to 50 PT – Part 7:
Prefabricated tertiary treatment units, chemical / electrical

Detailed results and information on the test are provided in test report PIA2024-T7-469S14.



Extract of performance details (EN 12566-7, Annex A: Tertiary treatment efficiency test)

Organic daily load (influent, nominal)	0.01 kg BOD ₅ /d		
Hydraulic daily load (nominal)	0.9 m ³ /d		
Treatment efficiency (nominal)		Efficiency	Effluent
	COD	56.1 %	23 mg/l
	BOD ₅	59.5 %	4 mg/l
	TN _b *	5.5 %	29.6 mg/l
	NH ₄ -N*	24.0 %	0.4 mg/l
	P _{tot}	95.9 %	0.2 mg/l
	SS	61.1 %	4 mg/l
Electrical consumption (nominal)	0.03 kWh/d		
Number of desludging (complete test – 7 weeks)	0		

* determined for temperatures $\geq 12^{\circ}\text{C}$ in the bioreactor

Tested by:

PIA – Prüfinstitut für Abwassertechnik GmbH
Hergenrather Weg 30
52074 Aachen, Germany

This certificate is for information purposes only and replaces neither the related test report nor the declaration of performance or the CE marking.
The results relate only to the tested object.



Notified Body
No.: 1739



Certified according to
ISO 9001:2015

A – Sustainable Certification

September 2024, Dipl.-Ing. Gabriel Schatzki
Head of department "Wastewater Testing"

Phosphate and nitrate reduction *from* **Marsh Industries**



Contents

1	Phosphate and nitrate reduction in off-mains sewage treatment	3
2	Marsh Nutra-Lite	4
3	Marsh Phos-Lite	6
4	Marsh nutrient removal technology	8
5	Marsh Aqua-Puratine-EL	9
6	Marsh Aqua-Puratine-G-APS	10
7	Testing	12
8	Health and safety	13
9	Maintenance	14
10	Handling and storage	14
11	Site planning	14
12	Installation procedure	14
13	Waste removal and servicing	15
14	Desludging	15

Appendices

A	Nutra-Lite test certificate	16
B	Phos-Lite test certificate	17
C	Aqua-Puratine-EL test certificate	18
D	Aqua-Puratine-G-APS test certificate	19

1 Phosphate and nitrate reduction in off-mains sewage treatment

For over 20 years, Marsh Industries has led the way in off-mains sewage treatment, delivering solutions that meet BS EN 12566-3 standards. Growing concerns for the UK's natural environment and waterways have led to stricter regulations from Natural England over the past 4-5 years, targeting nitrate and phosphate reduction in wastewater.

These regulations align with the principle of **Nutrient Neutrality**, where nutrient loads from wastewater are mitigated to avoid impacting protected sites. Marsh Industries has responded by investing heavily in research and development to tackle these challenges, ensuring development projects can proceed sustainably.

Nutrient Neutrality is classified as follows:

- ✓ Development achieves nutrient neutrality when the nutrient load created through additional wastewater (including surface water) from the development is mitigated
- ✓ By designing development alongside suitable mitigation measures, additional nutrient loads can often be avoided or mitigated
- ✓ This approach is called 'nutrient neutrality'. It essentially allows developments to be permitted without impacting on the condition of protected sites

Source: Local Government Association Planning Advisory Service

Innovative phosphate reduction solutions

Marsh's latest advancements focus on achieving optimally low phosphate levels. Partnering with PIA Aachen in Germany, a leading testing house for off-mains solutions, Marsh developed a sustainable, chemical-free approach. This led to collaboration with Water Warriors in Kentucky, USA, whose expertise includes projects with the EPA, USDA, and OFWAT. The result is the Phos-Lite tertiary chamber, which uses Phos-Lite Pellets:

- ✓ Up to 96% phosphate removal
- ✓ Effluent phosphate levels as low as P Tot 0.2mg/l

The system combines the Marsh Nutra-Lite Sequential Batch Reactor (SBR) treatment plant with the Phos-Lite chamber. It is tested and certified for up to 50PE, while the Gem-APS system is recommended for larger applications, using safe levels of ferric and aluminium metals.

The Aqua-Puratine range

Marsh also developed the Aqua-Puratine range, which integrates intelligent chemical dosing with sewage treatment plants. The Aqua-Puratine-G-APS achieves 83.7% phosphate reduction, delivering effluent levels as low as P Tot 0.9mg/l when paired with the Aqua-Puratine-Ensign EL system.

Supporting information

This document outlines the functionality and performance of Marsh's solutions, along with supporting certifications and technical documentation. Stakeholders are encouraged to consider the UK Forward for Packaged Sewage Treatment Plants in EN12566 testing when evaluating systems.

2 Marsh Nutra-Lite SBR (Sequential Batch Reactor)

Natural, non-dosing solution

The Marsh Nutra-Lite is an advanced Sequential Batch Reactor (SBR) sewage treatment plant designed to enhance effluent quality for off-mains wastewater systems and significantly reduce biological nitrates.



Figure 1
Combined Nutra-Lite SBR (advanced sewage treatment plant)
and Phos-Lite (Phosphate reduction system)

The Nutra-Lite is available in capacities catering to sites for up to 50 people with state of the art technology and rigorously tested, the Nutra-Lite sets a new standard for sustainable wastewater management.

Boasting the highest overall discharge quality of any plant available today. A unique self-cleaning sediment reduction valve ensures total control over suspended solids. No mechanical parts provide reliability and efficiency.

The Nutra-Lite harnesses SBR technology, achieving an impressive 84% biological reduction in nitrates. Unlike other traditional methods, no chemicals or carbon are used – just biological processes.

Nutra-Lite not only excels in phosphate and nitrate removal but also significantly reduces other key effluent constituents:

COD	95.8%	33 mg/l
BOD	98.7%	4 mg/l
TNb	83.9%	11.1 mg/l
NH ₄ n	99.1%	0.5 mg/l
P _{tot}	34.3%	6 mg/l
SS	97.1%	11mg/l

How does it work?

The Nutra-Lite system features two chambers: a primary chamber and an aeration chamber. Wastewater first enters the primary chamber. From there, the system runs through four distinct cycles:

- 1 **Fill** – Effluent moves from the primary to the aeration chamber
- 2 **Nitrification** – Air and bacteria facilitate nitrification
- 3 **De-nitrification** – The process mixes the water and starves it of oxygen
- 4 **Discharge** – Treated effluent is released

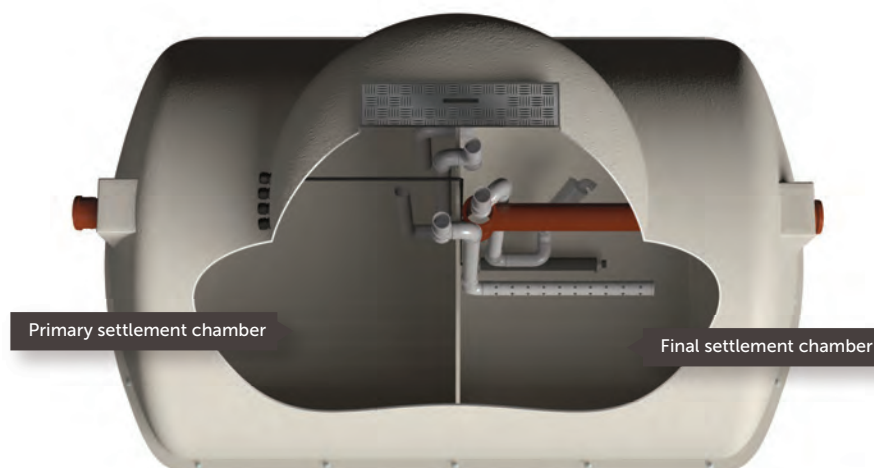


Figure 2
Nutra-Lite top view showing the two chambers

Additional sub-phases include settling and controlled sludge return, with an overflow function operating internally.

A single compressor powers the entire plant, managed by a bespoke controller that runs the process. The system is digitally enabled, with options for Wi-Fi and GSM connectivity, allowing remote monitoring, control, and programming. The low-power setup ensures energy efficiency, as it doesn't rely on continuous 24-hour aeration.

All Nutra-Lite plants feature bi-directional communication for maintenance and monitoring. Telemetry options include mobile connectivity or homeowner Wi-Fi/internet.

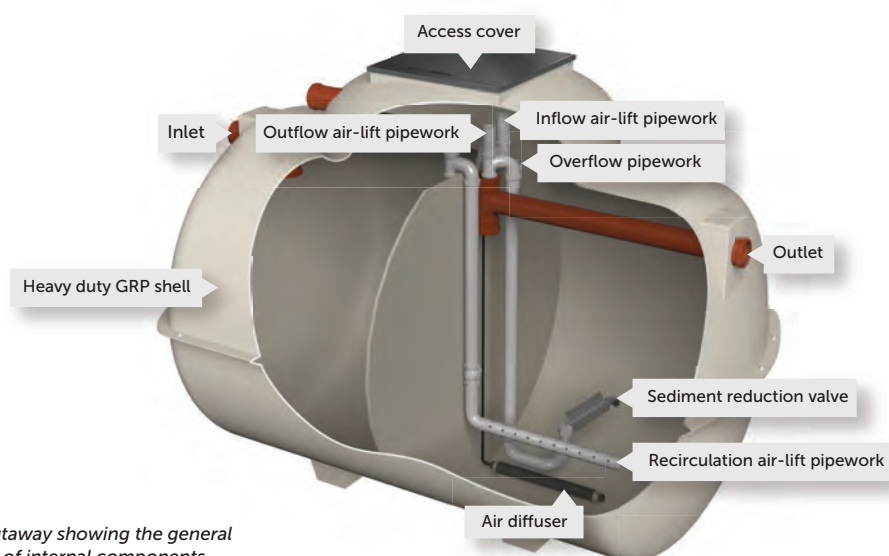


Figure 3
Nutra-Lite cutaway showing the general arrangement of internal components

Rigorously tested at the world-leading notified test centre PIA GmbH, in Aachen, Germany, the Nutra-Lite is certified to BS EN 12566-3 after 50 weeks of continuous testing. This system holds accreditation to EN12566-3 Annex B for systems of up to 50 Population Equivalent (PE) and complies with the UK Forward for BSEN12566-3, demonstrating its reliability and effectiveness.

3 Marsh Phos-Lite (Phosphate reduction system) Natural, non-dosing solution

The Marsh Phos-Lite is a groundbreaking product designed to efficiently remove phosphate from wastewater. Utilising a unique adsorption process, Phos-Lite binds phosphorus to the surface of its media, which is composed of naturally occurring elements. This ensures long-term performance across varying flow rates and influent concentrations.



Figure 4
Combined Phos-Lite (Phosphate reduction system) and Nutra-Lite SBR (advanced sewage treatment plant)

Recommended for up to 35PE (population equivalent), Phos-Lite is fully scalable to meet larger demands. The plant is engineered for maximum retention time, guaranteeing stable, low effluent phosphorus concentrations certified by PIA GmbH at 0.2mg/l.

Phos-Lite not only excels in phosphate removal but also significantly reduces other key effluent constituents.

The Marsh Nutra-Lite treats effluent to the following standards:

BOD	4mg/ltr
Suspended Solids	11mg/ltr
Ammonia	0.5mg/ltr

When the Marsh Nutra-Lite and Marsh Phos-Lite are combined, the effluent quality is further improved to:

BOD	1.62mg/ltr
Suspended Solids	4.3mg/ltr
Ammonia	0.38mg/ltr
PTot	0.26mg/ltr
TNb	10.5mg/ltr

Test results achieved when combined with the Marsh Ensign:EL

COD	56.1%	23 mg/l
BOD	59.5%	4 mg/l
TNb	5.5%	26.5 mg/l
NH4n	24%	0.4 mg/l
Ptot	95.9%	0.2 mg/l
SS	61.1%	4 mg/l

Designed to retain up to 8.5kg of phosphorus in a 6PE domestic plant (British Water Flows and Load 4), the Marsh Phos-Lite offers reliable performance. Media performance will be assessed at pre-determined intervals and replaced if necessary. The longevity of the media will be influenced by the actual flows and loads entering the plant.

The plant uses Phos-Lite Pellets, a natural mineral media, to reduce phosphate levels, simplifying operations and reducing the environmental impact of chemical use.

The non-dosing approach minimises the need for maintenance and chemical adjustments, leading to further cost savings.

By achieving phosphate levels as low as 0.2mg/l, the plant ensures compliance with the tightest environmental standards, allowing water companies to meet regulatory obligations.

The plant is designed for seamless integration into existing systems, making it versatile for new installations and retrofits.

How does it work?

Effluent from the sewage treatment plant enters the Phos-Lite system, first passing through a nanofiltration device (technology that is also used in the Marsh Marator oil separator range).

The filtered effluent then moves into the primary chamber, where a pump periodically pushes water through Phos-Lite Pellets. These pellets absorb phosphates by binding phosphorus to their surface. The process is optimised within a water column, ensuring maximum contact time with the media.

Marsh Industries is the sole provider in the UK wastewater market with access to these specialised pellets. These pellets can also be used for phosphate reduction in other settings, such as surface water runoff on highways or discharge to lakes.

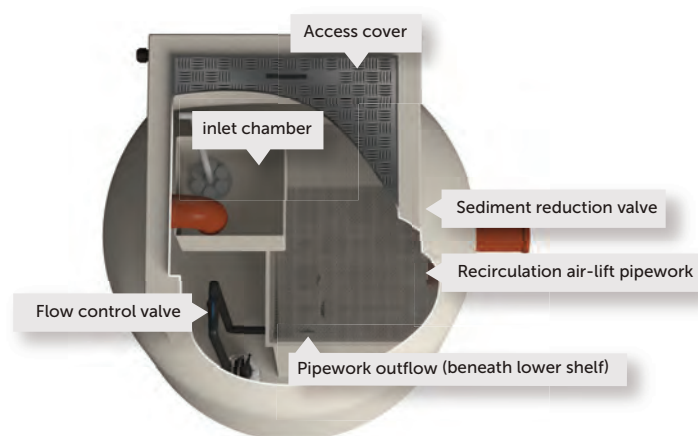


Figure 5
Phos-Lite top view showing the two chambers

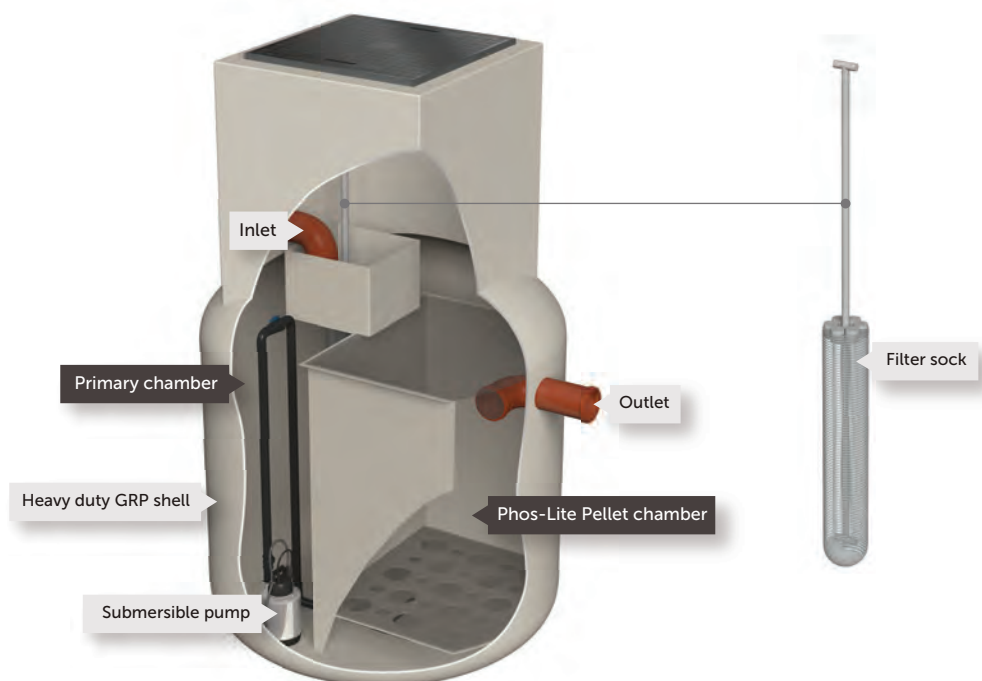


Figure 6
Phos-Lite cutaway showing the general
arrangement of internal components

4 Marsh nutrient removal technology

Marsh industries offers enhanced capability wastewater treatment through its Aqua-Puratine-EL environmentally low impact process, combined with the Marsh Aqua-Puratine-G-APS intelligent controlled dosing system (Figure 7). The combination of treatment processes in each unit delivers highly effective reduction of ammonia, nitrate and phosphate as well as suspended solids and biological oxygen demand (BOD).

The process has been devised to help reduce the requirement for offsetting where new buildings are in 'Natural England' (NE) designated 'Nutrient Neutrality' (NN) areas and where tighter consent to discharge is applied.



Figure 7
Combined Aqua-Puratine-EL (environmentally low-impact sewage treatment plant) and Aqua-Puratine-G-APS (Aerated Precipitation System) provides enhanced nutrient removal

The Marsh Aqua-Puratine-EL delivers effective wastewater treatment through settlement of solids in its primary chamber, followed by aerobic biological treatment through natural biofilms supported on moving, inert media in the biozone, and settlement of excess biomass in the final chamber. Marsh has exclusive access to a biofilm support media that provides very high efficiency nitrification, for example the removal of ammonia delivering low concentrations of 1mg/l ammonia-N in the final effluent. At the same time, partial denitrification is achieved through simultaneous nitrification/denitrification to reduce the final effluent nitrate concentration.

The treatment performance of Aqua-Puratine-EL is accredited to EN12566-3 Annex B through testing with Prüfinstitut fur Abwassertechnik (PIA) GmbH, Aachen, Germany for wastewater treatment systems up to 50 PE (See Appendix C).

The Aqua-Puratine-G-APS has been developed by Marsh Industries to further improve effluent discharge standards for off-mains wastewater treatment plants. This tertiary treatment unit is primarily designed to reduce phosphate discharge to reduce eutrophication in rivers and lakes but also provides additional removal of BOD and chemical oxygen demand (COD).

The treatment performance of the Aqua-Puratine-G-APS is accredited to EN12566-3 Annex A, through testing with Prüfinstitut fur Abwassertechnik (PIA) GmbH, Aachen, Germany, for wastewater treatment systems up to 50 PE (See Appendix D).

Where there is a requirement to meet tighter discharge consents for nutrients, ie, phosphorus and/or total nitrogen, Marsh recommends deployment of the Aqua-Puratine-EL in combination with the Aqua-Puratine-G-APS. This system shows a significant reduction in phosphate and total nitrogen compared to Natural England (NE) default values for septic tanks and standard package treatment plants (PTPs) (See table 1).

Parameter	NE default for septic tanks	NE default for PTPs	Marsh Aqua-Puratine-EL and G-APS
Phosphate (mg/l)	11.7	9.7	0.9
Total nitrogen (mg/l)	96.3	72.9	Up to 28

Table 1
Nutrient removal performance of off-mains sewage treatment plants

5 Marsh Aqua-Purative-EL (Environmentally low impact)

The Marsh Aqua-Purative-EL is designed to reduce pollutants in domestic wastewater, including ammonia and nitrates, to an acceptable standard for discharge into a watercourse, ditch or drainage field. This capability is delivered through a combination of primary settlement, Marsh's unique moving bed biofilm reactor (MBBR) technology, followed by final settlement (Figures 8 and 9). These processes are combined in a single robust glass reinforced plastic (GRP) tank divided into four chambers. Approximately 40% of the volume is for primary settlement followed by a two-stage biozone, comprising 40% of the volume with 20% for final settlement. The effluent process follows this sequence as more wastewater enters the plant by gravity.

These proportions are maintained when a plant needs to be divided into multiple tanks due to geology, ground conditions or practical installation requirements. They can also be combined with tertiary treatment into a single tank, meeting all relevant and standard certifications using certified individual processes. A pump can be installed in the final settlement zone so that final effluent can be discharged to the environment or subsequent tertiary treatment when circumstances make gravity discharge impractical.

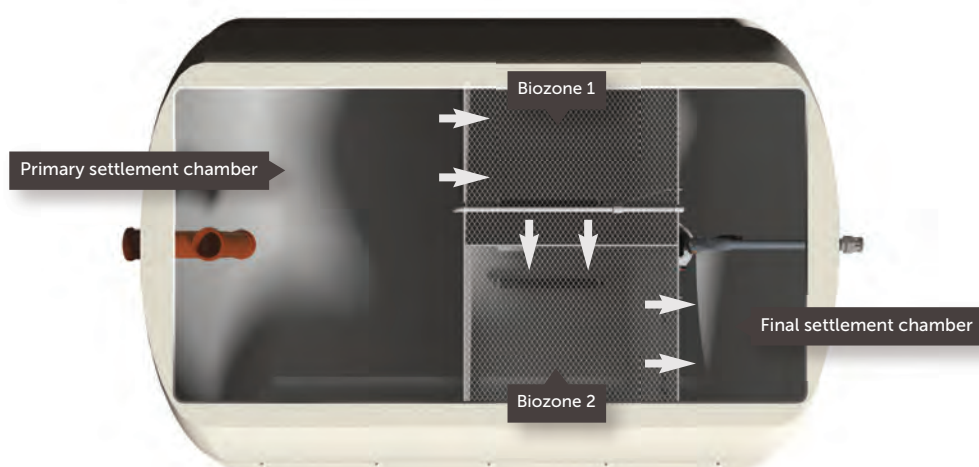


Figure 8
Aqua-Purative-EL top view showing the four chambers

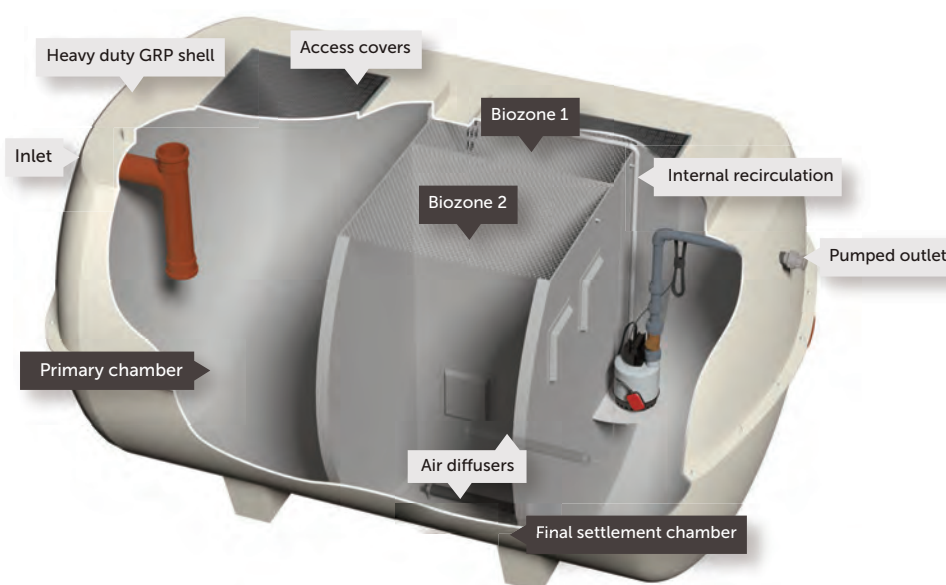


Figure 9
Aqua-Purative-EL 3D cutaway showing the general arrangement of the four chambers and internal components

The overall design of the Aqua-Puratine-EL is based upon the UK Government endorsed British Water flows and loads for domestic wastewater treatment under the General Binding Rules. These standards provide robust guidelines so that treatment plants meet the required environmental standards, with a margin of safety, and have been agreed by the Environment Agency (EA), the Scottish Environmental Protection Agency (SEPA) and the Northern Ireland Environment Agency (NEIA).

Reference

<https://www.gov.uk/guidance/general-binding-rules-small-sewage-discharge-to-the-ground#bs>

<https://www.britishwater.co.uk/page/publications#wastewater%20treatment%20plant%20publications>

6 Marsh Aqua-Puratine-G-APS (Intelligent Controlled Dosing)

Designed and developed by Marsh Industries, The Aqua-Puratine-G-APS is a controlled chemical dosing system for the removal of phosphates for off-mains sewage treatment plants. The correct amount of chemical infusion is ensured when dosing is only initiated when there is flow to the Aqua-Puratine-G-APS. In this way, the amount of Aluminium or Ferric dosed matches the influent phosphate load and avoids wasteful and potentially harmful overdosing of the chemical.

Primarily developed to reduce phosphate discharge, the Aqua-Puratine-G-APS also provides polishing treatment through further reduction of COD and BOD. The Aqua-Puratine-G-APS can be sized for use in conjunction with any correctly sized sewage treatment plant to improve effluent discharge quality.

The Aqua-Puratine-G-APS consists of two equal sized chambers (Figure 10). The primary chamber receives effluent from the previous sewage treatment process along with the correct chemical dose. Aeration ensures that there is good mixing to provide efficient phosphorus removal. The second stage provides settlement to remove the precipitated phosphorus and residual biosolids.

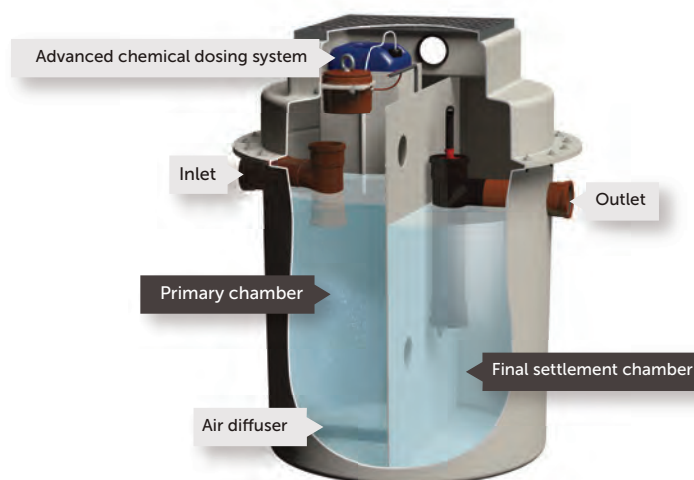


Figure 10
Aqua-Puratine-G-APS 3D cutaway showing two chambers

Key to the system's performance is control and automation. Marsh Controls and Marsh Alarms use industrial quality aeration and dosing timers in addition to high quality peristaltic pumps. This superior functionality avoids problems from siphoning and capillary dosing during operation.

The pumped outlet of the preceding sewage treatment plant is monitored by the control panel and doses the chemicals accordingly. If an existing plant uses gravity discharge, a small intermediate pump chamber is installed. This allows for an accurately measured dose of chemicals to be added when the pump chamber is emptied to the Aqua-Puratine-G-APS. It also ensures that, if the homeowner is not present for a day, weekend, or longer, no chemicals are applied. This unique feature eliminates the need for homeowner intervention during absences.

Unlike other products currently on the market that add chemicals continuously at a fixed rate, the Marsh intelligent control

system adjusts dosing based on the inflow. In the case of a homeowner being absent for days or weeks, other systems will continue to dose chemicals. This will result in increased residual concentrations of metals in the effluent that can be hazardous to children, wildlife and the environment. The Aqua-Puratine-G-APS eliminates these concerns by only delivering the chemicals when there is inflow. Furthermore, if the monitored pump stays on, or develops a fault for any reason, dosing will be turned off, as the control panel will withhold dosing for a specified period.

Although the Aqua-Puratine-G-APS can reduce phosphate to less than 1 mg/l, the application of chemicals can be adjusted for phosphate discharge levels that are less strict. This allows for a reduction in the long-term chemicals. Additionally, the Aqua-Puratine-G-APS is energy efficient requiring only 1 kWh per day of electricity.

In summary, there are a number of features to ensure that chemical dosing is carried out correctly to meet the requirements of the Environment Agency and Natural England:

- ✓ Dosing is flow-weighted to ensure that the correct amount of chemical is added and that metal residuals are minimised
- ✓ The Aqua-Puratine-G-APS intelligent dosing system was tested in conjunction with the Marsh Ensign: EL at PIA in Germany
- ✓ The Aqua-Puratine-G-APS was tested using alum as the coagulant, as residual consents are generally stricter for alum. Iron can be used if preferred by the Regulatory Body. Either coagulant can provide the stated efficiency
- ✓ All Aqua-Puratine-EL and Aqua-Puratine-G-APS combinations have a GSM/2G/4G monitoring alarm to notify Marsh and the home owner in the case of a fault

Outstanding benefits

Marsh has combined technology, reporting, monitoring, and maintenance to produce the safest and most comprehensive treatment processes for water treatment in the UK.

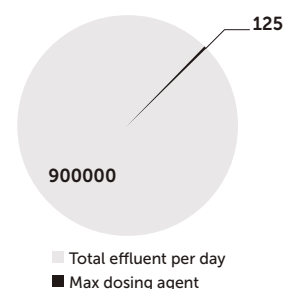
- ✓ Natural England and/or the Regulator should be consulted when installing the Aqua-Puratine-EL and Aqua-Puratine-G-APS, as this could result in major reductions in mitigation for the builder/developer
- ✓ The Aqua-Puratine-EL and Aqua-Puratine-G-APS reduces phosphate levels and has extremely low Ammonia discharge results, protecting rivers, waterways, and wildlife
- ✓ The Aqua-Puratine-EL and Aqua-Puratine-G-APS provides excellent performance for the reduction of COD (chemical oxygen demand) and BOD (biological oxygen demand), to avoid eutrophication in rivers and lakes
- ✓ The Aqua-Puratine-EL and Gem were tested and certified by PIA (Prüfinstitut für Abwassertechnik)
- ✓ The Aqua-Puratine-G-APS can also be used in conjunction with any sewage treatment plant* to improve effluent discharge quality
- ✓ The Aqua-Puratine-G-APS control panel monitors the inflow from the sewage treatment plant with alarm systems and applies the measured chemical accordingly, which is a main concern of Natural England
- ✓ Aqua-Puratine-G-APS is designed with the additional safeguard that if there is no influent flow, there will be no dosing
- ✓ The homeowner and/or Marsh are alerted when additional iron or chemical is required
- ✓ The Aqua-Puratine-G-APS reduces phosphates to less than 1mg/L, but Marsh Controls allow the chemical to be adjusted where phosphate discharge levels are less strict, thus reducing the long-term cost of chemicals
- ✓ The Aqua-Puratine-G-APS is also very efficient, requiring only 1kWh/day of electricity
- ✓ The Aqua-Puratine-G-APS intelligent dosing system was tested in conjunction with the Marsh Aqua-Puratine-EL plant at the notified test house PIA in Germany

** Marsh will need to know the measured discharge in litres per day to ensure the correct Aqua-Puratine-G-APS unit is sized. Based on a functional BSEN12566-3 compliant product.*

The table below provides effluent standards as tested and certified by PIA:

	Aqua-Puratine-EL		Aqua-Puratine-G-APS	
	Efficiency	Effluent	Efficiency	Effluent
COD	92.2%	63mg/l	57.6%	24mg/l
BOD	95.6%	14mg/l	75.8%	2mg/l
TNb	53.5%	28mg/l	11.5%	18mg/l
NH ₄ -N	97.8%	1.0mg/l	21.1%	0.4mg/l
P _{tot}	28.7%	5.4mg/l	83.7%	0.9mg/l
SS	94.5%	21mg/l	30.4%	14mg/l
Accreditation	EN12566-3 test Annex B		EN12566-7 test Annex A	

24 hours dosing is **0.014%** of total effluent (ml)



For optimum total process results above 25PE, the Aqua-Puratine-G-APS can be combined with the Nutra-Lite SBR sewage treatment plant to achieve the following effluent quality:

	Nutra-Lite Effluent	Aqua-Puratine-G-APS Effluent
COD	33mg/l	14mg/l
BOD	4mg/l	0.97mg/l
TNb	11.1mg/l	9.8mg/l
NH ₄ -N	0.5mg/l	0.4mg/l
P _{tot}	6mg/l	0.98mg/l
SS	11mg/l	7.7mg/l

Natural England and/or the Regulator should be consulted when installing the Nutra-Lite and Aqua-Puratine G-APS, as this could result in major reductions in mitigation for the builder/developer.

Achieving BOD below 1mg/l alongside TNb of just 9.8mg/l.

7 Testing

The following tables provide an overview of the basic specifications, which are calculated based on a loading of 150 litres per person per day and scaled for the range.

The figures are derived from recognised flows and loads for domestic sewage treatment plants.

The sizing of the plants is determined by the working volumes of the existing certified range of Ensign Standard and Ensign Shallow plants.

The tested system was based on a Marsh Ensign:Shallow model that incorporates a Polylok Filter. However, depending on the specific application, a Polylok filter may not be required.

Aqua-Puratine-EL EN12566-3 test Annex B

Treatment Plant Providing Effluent	PIA Municipal
Load Capacity	900 Litres / Day
BOD	300 Grams / Day
BioMedia	Warden Biopebble
Aqua-Puratine-EL	System 408B25
Tank Capacity (working)	3630 Litres
Air Compressor	2 x 60 Litres / Minute

*Please note the testing and certification as dated on the certificates.
See Appendices C and D*

Effluent Quality Achieved	Efficiency	Effluent
COD	92.2%	63mg/l
BODs	95.6%	14mg/l
TNb	53.5%	28mg/l
NH ₄ N	97.8%	1.0mg/l
P _{tot}	28.7%	5.4mg/l
SS	94.5%	21mg/l

The certificate confirms the performance of the Aqua-Purative-EL according to the EN 12566-3 standard giving an effluent 'TNb' concentration of 28 mg/l.

The total nitrogen bound (TNb) is the total concentration of nitrogen compounds as defined by the German Institute of Standardisation (DIN EN 12260:2003). This measure, usually quoted in the UK as total nitrogen (TN) includes nitrogen that appears in the form of ammonia, ammonium salts, nitrites, nitrates, and organic nitrogen compounds (nitrogen that would be present in proteins and other natural compounds).

The Aqua-Purative-EL uses Marsh's proven moving bed biofilm reactor (MBBR) technology (described as fluidised technology on the certificate) with a new design of support media, for which Marsh has exclusive access. This media provides an improved architecture for biofilm attachment that gives the excellent ammonia removal. This is shown by the effluent ammonia-nitrogen (NH₄-N in the certificate) concentration of 1 mg/l. The ammonia removal performance of 97.8% is excellent, with almost all the ammonia expected to be converted to nitrate, with very little or no nitrite.

The certificate indicates that denitrification is also occurring, with TN removal of 53.5 % (without denitrification, the effluent TN would be a maximum of 60.2 mg/l). Denitrification is the conversion of nitrates to nitrogen gas, effectively removing the nitrogen from the effluent.

Therefore, the maximum effluent nitrate concentration will be 27 mg/l, ie, the measured TN of 28 mg/l minus the ammonia-N of 1mg/l in the effluent. The effluent nitrate will be less than 27 mg/l as there will be some organic nitrogen present contributing to the TN.

Aqua-Purative-G-APS EN12566-7 test Annex A

The Aqua-Purative-EL has also been tested in combination with the Aqua-Purative-G-APS phosphate reduction unit. The certificate, Aqua-Purative-G-APS, shows the following additional performance when installed with the Aqua-Purative-EL range.*

The Aqua-Purative-G-APS is designed to further reduce phosphates, ammonia and BOD from wastewater that has been previously treated in a domestic sewage treatment plant. Tested in accordance with BS EN 12566-7 Annex A at PIA GmbH it offers excellent tertiary treatment performance in a small footprint.

Effluent Quality Achieved	Efficiency	Effluent
COD	57.6%	24mg/l
BODs	75.8%	2mg/l
TNb	11.5%	18mg/l
NH ₄ N	21.5%	0.4mg/l
P _{tot}	83.7%	0.9mg/l
SS	30.4%	14mg/l

8 Health and safety

These instructions are provided to ensure your safety. Please read them carefully before installing or using the equipment. It is crucial to retain this document with the system for future reference and include it in any on-site maintenance process description for cleaning and planned maintenance.

In the event of a site ownership transfer, the responsible individual must ensure that all relevant documentation is transferred as well, allowing the new owner to become familiar with the equipment's operation.

- ✓ Installation should only be performed by a qualified contractor. Any electrical work must be carried out by a certified electrician. We strongly recommend the use of protective workwear, including eye protection, dust masks, and gloves, when cutting GRP components, handling pipework, and working with aggregates.
- ✓ Contaminated surface water may contain substances that are harmful to human health, so it is important to observe good hygiene practices.
- ✓ Consideration should be given to selecting the appropriate access cover. The choice of covers should consider the unit's location and the expected traffic loads in the local area. The Marsh Ensign Standard and Shallow range of plants are supplied with a pedestrian duty access cover as standard.

- ✓ If your unit is not equipped with the optional Marsh turret guard, take precautions to prevent falls into the unit when removing covers.
- ✓ Adhere to all local and legislative health and safety requirements.
- ✓ Ensure that you are familiar with the working area and make sure the site's responsible individual is aware of your work. Document a Safe System of Work, and it may also be necessary to obtain a permit to work.

9 Maintenance

Correct and timely maintenance is crucial for the correct operation of the system. It is important not to solely rely on alarms to indicate when emptying or maintenance is required. Regular visual inspections of the system should be conducted, and a functional test of any installed alarm system should be performed periodically.

The removal of any waste should be carried out by a licensed waste carrier. You can obtain a list of licensed waste carriers from your local authority.

10 Handling and storage

Upon delivery, ensure that the unit is placed in a safe location before installation. Keep in mind that the centre of gravity of the unit may not be at the centre of the tank. This risk increases as the size of the system increases, so it is crucial to take great care to ensure the stability of the unit during lifting.

- ✓ Note that if the unit has been stored on-site for an extended period before installation, water may accumulate inside, which can add to its instability.
- ✓ When lifting, do not use chains around the body of the unit. Instead, use a spreader bar to ensure stability during the lift and to distribute the load evenly. Use a spreader bar when slings are at an angle of less than 30 degrees from vertical.
- ✓ Select lifting equipment based on the weight and size of the unit, as well as the required lifting distance on-site. Marsh Industries does not accept responsibility for the selection of lifting equipment.
- ✓ When stored on-site, the unit must be placed on a flat, level ground that is free from risks of impact damage or piercing.

11 Site planning

Consider the following points before installing the equipment:

- ✓ The outfall from the unit must have consent from the relevant local authority and/or Environment Agency.
- ✓ The installation should have Planning and Building Control approval.
- ✓ Consider the use of manual or automatic cut-off valves upstream and downstream of the unit to isolate the system during emergencies or maintenance.
- ✓ Exclude roof water from the system.
- ✓ Assess ground conditions and water table levels.
- ✓ If the discharge is to a soakaway (for class 1 units only), conduct a percolation/porosity test as part of the assessment for suitability of sub-soil drainage. Refer to Part H of Building Regulations for further information.
- ✓ Allow at least 1 meter of clear, level ground around the access covers for routine maintenance.
- ✓ Ensure that a mains water supply is accessible for routine cleaning and refilling the unit after waste material and liquid removal.
- ✓ Provide an electrical supply for the system.

12 Installation procedure

- ✓ When designing the concrete backfill, consider specific site conditions, and ensure it can withstand any applied loads during and after installation to prevent the tank from being subjected to excessive stress.
- ✓ If the excavation cannot maintain a vertical wall safely, use a suitable trenching sheet system and bracing to shore up the sidewalls and maintain a vertical wall throughout the excavation.

- ✓ Do not remove the shoring system completely until the backfill is complete, but before the concrete fully hardens.
- ✓ In areas where the water table is above the bottom of the excavation or flooding is possible, use an appropriate pumping method to dewater the excavation.
- ✓ During installation, take care to uniformly support the body of the unit to avoid placing excessive "point loads" on the unit.
- ✓ Excavate a hole with sufficient length, width, and depth to accommodate the tank, along with a minimum concrete surround thickness of 225mm.
- ✓ Consider the depth of the unit, concrete base slab, haunch, and proposed inlet invert depth.
- ✓ Construct a suitable concrete base slab that matches the site conditions and ensure it is flat and level.
- ✓ Once the concrete base slab is set enough to support the unit, lay a concrete haunch on the cast slab to provide even support beneath the unit.
- ✓ Lower the unit onto the haunch using appropriate lifting equipment.
- ✓ Ensure that the unit is level after installation to facilitate correct operation of the internal components.
- ✓ Pour approximately 300mm of clean water simultaneously into each chamber of the unit. Do not overfill.
- ✓ Pour concrete backfill to a depth of approximately 300mm beneath and around the tank, ensuring good compaction to eliminate voids. Do not use vibrating pokers.
- ✓ Ensure a continuous pouring of concrete backfill, while maintaining the internal water level no more than 300mm above the backfill level at all times. Continue this process until the backfill reaches a level slightly below the underside of the outlet connection, allowing sufficient space for connecting the inlet and outlet pipework.
- ✓ Connect the inlet and outlet drains and vent pipes when safe access to the backfill is possible. If the inlet and outlet pipework are not immediately compatible with the fittings on the unit, you can use proprietary flex seal couplings.
- ✓ Continue backfilling with concrete over the tank body until reaching the required level.
- ✓ Build up a shell of concrete with a minimum thickness of 225mm around the access shaft(s).
- ✓ Temporarily brace the access shaft to prevent distortion.
- ✓ In areas with traffic, construct a suitable top slab that rests on a suitable foundation to prevent superimposed loads from being transmitted to the unit and access shafts.
- ✓ Loads applied to covers and frames should bear on the top slab, not the access shaft.
- ✓ Fill the unit with clean water up to the invert level of the outlet pipe.
- ✓ Place or mark the unit identification inside the neck for future reference.

13 Waste removal and servicing

- ✓ The frequency of waste removal (desludging) depends on the influent quality and the required effluent quality.
- ✓ Adjust the desludging frequency to ensure optimal performance of all tanks, considering any changes in sludge generation at each visit.
- ✓ Maintain a log documenting any waste removal or cleaning activities.
- ✓ Inspect the volume of waste accumulated at least every 6 months as a minimum requirement.
- ✓ If alarm probes are fitted, remove, and clean them with water whenever waste material is removed.

14 Desludging procedure

- ✓ Isolate the unit and ensure no flow enters the system.
- ✓ Temporarily turn off and electrically isolate the control panel to pause dosing and aeration.
- ✓ Secure the area to prevent access by animals and children and remove the access cover.
- ✓ Lower the desludging hose to the base of the tank and empty the unit of any accumulated sludge. Remove only the necessary amount of water and avoid removing any bio-media.
- ✓ Remove, inspect, and clean any filters. Replace them if necessary.
- ✓ Ensure access to and clean all compartments.
- ✓ If an alarm probe is fitted, remove it, clean it with water, and then replace it.
- ✓ Turn on the compressor(s) and check that aeration continues.
- ✓ Verify the functionality of any pumps.
- ✓ Refill the system (all tanks) with clean water up to the outlet level.
- ✓ Securely replace any covers or guards and check the security of any locks that are fitted.

Appendix A

Nutra-Lite test certificate



Certificate

Nr. 420.01C03

MI Nutra-Lite

Plant with active sludge in Sequencing Batch Reactor (SBR) and primary settlement

Marsh Industries Limited
Units 3-13 Addington Park Industrial Est., NN14 4AS Northants, UK

EN 12566-3:2005+A2:2013, Annex B: Treatment efficiency test
Small wastewater treatment systems for up to 50 PT – Part 3:
Packaged and/or site assembled domestic wastewater treatment plants

Detailed results and information on the test are provided in test report PIA2024-420B06.

Extract of performance details (EN 12566-3, Annex B: Treatment efficiency test)

Organic daily load (influent, nominal)	0.20 kg BOD ₅ /d		
Hydraulic daily load (nominal)	0.6 m ³ /d		
Treatment efficiency (nominal)		Efficiency	Effluent
	COD	95.8 %	33 mg/l
	BOD ₅	98.7 %	4 mg/l
	TN _b *	83.9 %	11.1 mg/l
	NH ₄ -N*	99.1 %	0.5 mg/l
	P _{tot}	34.3 %	6.0 mg/l
	SS	97.1 %	11 mg/l

Electrical consumption (nominal)	0.7 kWh/d
Number of desludging (30 weeks testing EN 12566-3 without desludging)	2 after 30 week test cycle
Number of maintenance operations during the test (without start-up phase)	0

* determined for temperatures $\geq 12^{\circ}$ C in the bioreactor

Tested by:
PIA – Prüfinstitut für Abwassertechnik GmbH
Hergenrather Weg 30
52074 Aachen, Germany

This certificate is for information purposes only and replaces neither the related test report nor the declaration of performance or the CE marking. The results relate only to the tested object.

September 2024, Dipl.-Ing. Gabriel Schatzki
Head of department "Wastewater Treatment"


 Notified Body
No.: 1739


 Certified according to
ISO 9001:2015

Appendix B

Phos-Lite test certificate



Certificate

Nr. 469.01C1

MI Phos-Lite

Module for chemical-physical after-treatment of sewage, tested in combination by use of a gravity operated plant

Marsh Industries Limited
Units 3-13 Addington Park Industrial Est., NN14 4AS Northants, UK

EN 12566-7:2013, Annex A: Tertiary treatment efficiency test
Small wastewater treatment systems for up to 50 PT – Part 7:
Prefabricated tertiary treatment units, chemical / electrical

Detailed results and information on the test are provided in test report PIA2024-T7-469S14.



Extract of performance details (EN 12566-7, Annex A: Tertiary treatment efficiency test)

Organic daily load (influent, nominal)	0.01 kg BOD ₅ /d		
Hydraulic daily load (nominal)	0.9 m ³ /d		
Treatment efficiency (nominal)		Efficiency	Effluent
	COD	56.1 %	23 mg/l
	BOD ₅	59.5 %	4 mg/l
	TN _b *	5.5 %	29.6 mg/l
	NH ₄ -N*	24.0 %	0.4 mg/l
	P _{tot}	95.9 %	0.2 mg/l
	SS	61.1 %	4 mg/l
Electrical consumption (nominal)			0.03 kWh/d
Number of desludging (complete test – 7 weeks)			0

* determined for temperatures $\geq 12^{\circ}$ C in the bioreactor

Tested by:
PIA – Prüfinstitut für Abwassertechnik GmbH
Hergenrather Weg 30
52074 Aachen, Germany

This certificate is for information purposes only and replaces neither the related test report nor the declaration of performance or the CE marking. The results relate only to the tested object.

September 2024, Dipl.-Ing. Gabriel Schatzki
Head of department "Wastewater Testing"



Notified Body
No.: 1739



Certified according to
ISO 9001:2015

Appendix C

Aqua-Puratine-EL test certificate



Certificate

408.01C01

Marsh Industries Limited
Head Office Addington Park Industrial Park, Little Addington NN14 4AS UK

EN 12566-3, Annex B
Small wastewater treatment systems for up to 50 PT

Small wastewater treatment system Ensign Range E L
Fluidised bed reactor system in a GRP tank

Test report PIA2022-408B25

Evaluation of the nominal sequences of the 38-week testing

Nominal organic daily load (influent)	0.30 kg BOD ₅ /d
Nominal hydraulic daily load	0.9 m ³ /d
Material	GRP

Treatment efficiency	Efficiency	Effluent
COD	92.2 %	63 mg/l
BOD ₅	95.6 %	14 mg/l
TN _b	53.5 %	28 mg/l
NH ₄ -N	97.8 %	1.0 mg/l
P _{tot}	28.7 %	5.4 mg/l
SS	94.5 %	21 mg/l

Evaluation of the complete 38-week testing

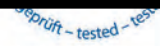
Electrical consumption	1.9 kWh/d
Number of desludging	0

Tested by:

PIA – Prüfinstitut für Abwassertechnik GmbH
(PIA GmbH)
Hergenrather Weg 30
52074 Aachen, Germany

This document replaces neither the declaration of performance nor the CE marking.





Martina Wermter August 2022


 Notified Body
No.: 1739




Deutsche
Akkreditierungsstelle
D-PL-17712-01-00

Appendix D

Aqua-Puratine-G-APS test certificate



Certificate

405.01C01

Marsh Industries Limited
Units 2-20 Addington Park Industrial Est., NN14 4AS Northants, United Kingdom

EN 12566-7, Annex A
Small wastewater treatment systems for up to 50 PT

Small wastewater treatment system Gem APS – (P & NH4-N)
APS - Aerated precipitation system
Test report PIA2021-T7-405S25

Nominal organic daily load (influent)	0.01 kg BOD ₅ /d																					
Nominal hydraulic daily load	0.9 m ³ /d																					
Material	GRP																					
Treatment efficiency	<table border="0"> <tr> <th></th> <th>Efficiency</th> <th>Effluent</th> </tr> <tr> <td>COD</td> <td>57.6 %</td> <td>24 mg/l</td> </tr> <tr> <td>BOD₅</td> <td>75.8 %</td> <td>2 mg/l</td> </tr> <tr> <td>TN_b</td> <td>11.5 %</td> <td>18 mg/l</td> </tr> <tr> <td>NH₄-N</td> <td>21.1 %</td> <td>0.4 mg/l</td> </tr> <tr> <td>P_{Trt}</td> <td>83.7 %</td> <td>0.9 mg/l</td> </tr> <tr> <td>SS</td> <td>30.4 %</td> <td>14 mg/l</td> </tr> </table>		Efficiency	Effluent	COD	57.6 %	24 mg/l	BOD ₅	75.8 %	2 mg/l	TN _b	11.5 %	18 mg/l	NH ₄ -N	21.1 %	0.4 mg/l	P _{Trt}	83.7 %	0.9 mg/l	SS	30.4 %	14 mg/l
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NH ₄ -N	21.1 %	0.4 mg/l																				
P _{Trt}	83.7 %	0.9 mg/l																				
SS	30.4 %	14 mg/l																				
Electrical consumption	0.1 kWh/d																					
Number of desludging	1																					

Tested by:

PIA – Prüfinstitut für Abwassertechnik GmbH
(PIA GmbH)
Hergenrather Weg 30
52074 Aachen, Germany

This document replaces neither the declaration of performance nor the CE marking.



Notified Body
No.: 1739





Deutsche
Akreditierungsstelle
D-PL-17712-01-00



Prüft - tested to

Martina Wermter January 2022

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