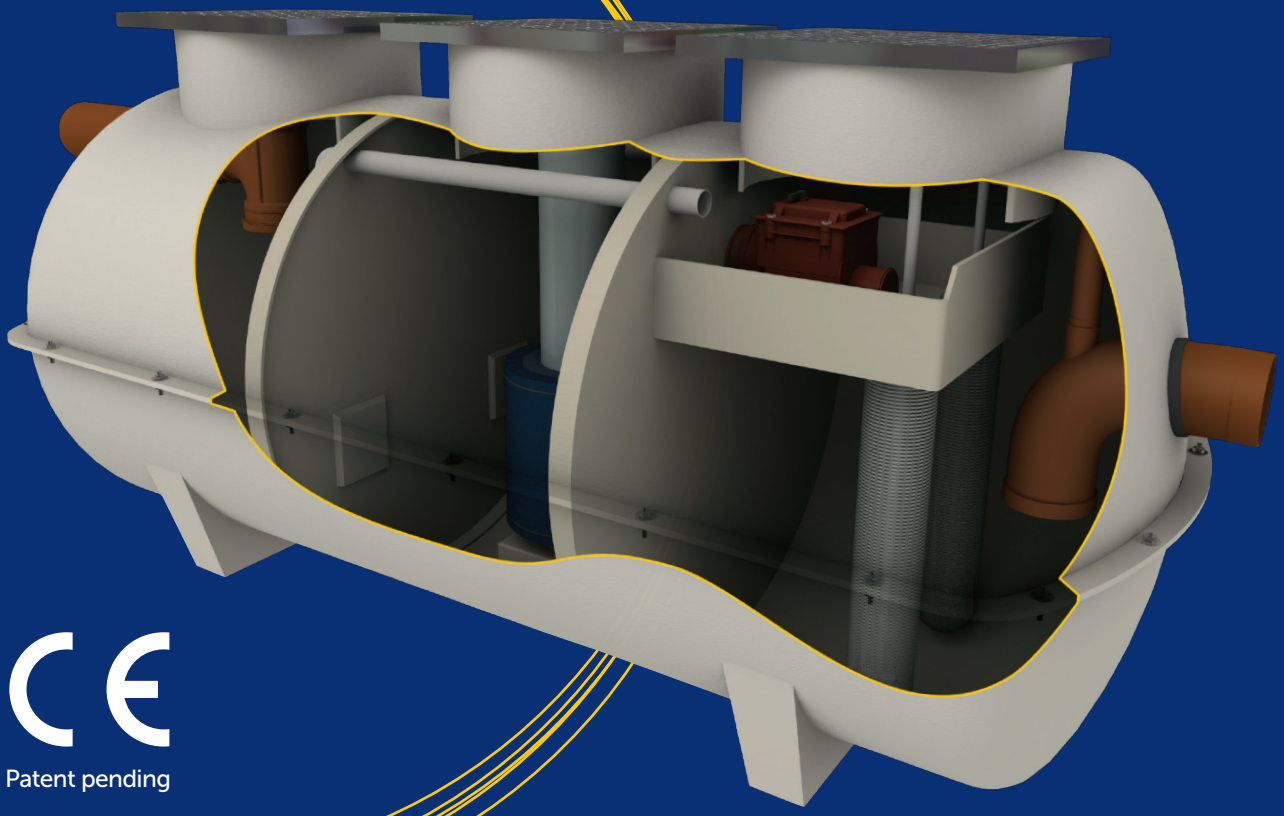
Marsh:Marator
Technical showcase

High performance full retention oil separators for sites where the "industry standard" is just not good enough

Industry-leading effluent discharge of <0.1mg/l
(Industry standard: <5mg/l)

Tested and approved to BSEN858



CE

Patent pending

MARSH

www.marshindustries.co.uk

Are outmoded EN standards an environmental concern?

Marsh Industries technical sales director, Stephen Le Tissier, questions whether the current testing regime within European Standard BS EN 858 still provides an acceptable level of pollutant after separation.

The most common form of separation technology is a vessel designed to separate contaminants by gravity to a specific standard of discharge.

These systems are typically used in surface water drainage systems for car parks, petrol station forecourts and other 'at risk' locations.

Vessel design is calculated from the volume, flow rate of combined water, and the contaminate to ensure sufficient retention time for gravity separation to occur. 'Forced flow' separation can also be achieved by adding a coalescing device within the vessel.

Between 1970 and 2000, separator technology evolved from three chamber designs to include bypass flow designs with additional components such as coalescing filters, automatic closure devices, alarms as well as contaminant recovery/removal systems allowing for recycling of light liquids.

Current EN standard

The European Standard, BS EN 858 parts 1&2, was introduced in 2002 to normalise design and regulate testing of products across Europe. This standard settled on a two-tier quality level – class 1 and class 2.

Class 1 – designed to achieve a discharge concentration of less than 5mg/ltr of oil in the discharge
Class 2 – designed to achieve a discharge concentration of less than 100mg/ltr of oil in the discharge

Once testing is complete and approval achieved, manufacturers are free to bring their products to market.

The effects of current standards

A good starting point for any product is to set out relevant standards and levels of quality, both in product build and product performance. However, since the introduction of BS EN 858 in 2002, product development in gravity oil/liquid separation has remained static.

Figure 1: Typical gravimetric separator

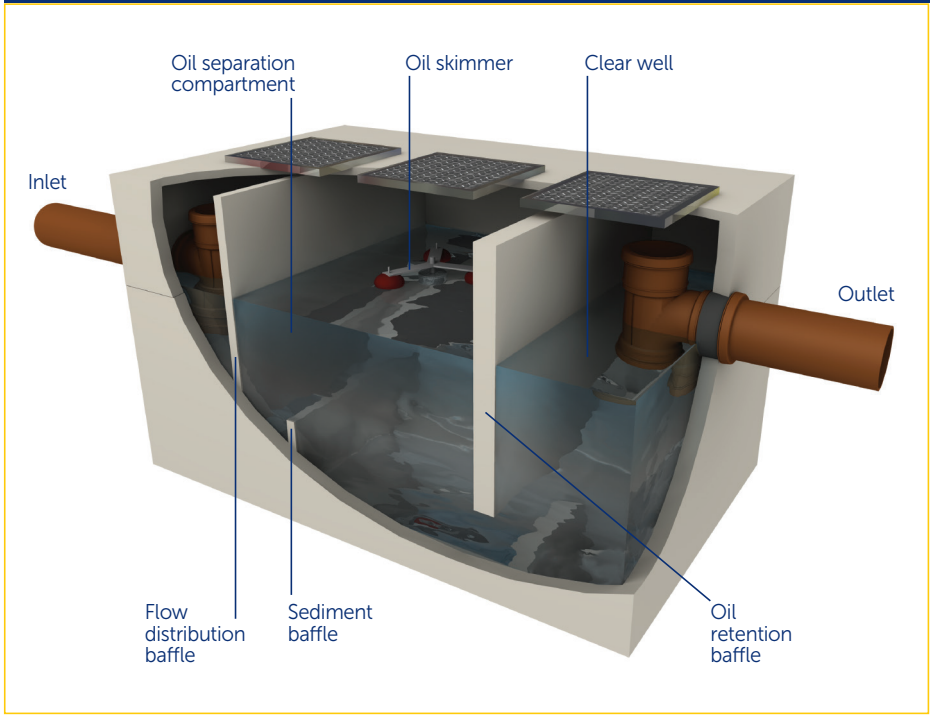


Figure 2: Toxic effects of stormwater contaminants (Source: Krenkel and Novotny, 1980)

Contaminant	Potential effect on humans	Recommended criteria	
		Drinking water	Aquatic life
Lead	Nephritis	50 mg/litre	0.01 LC_{50}
Zinc	Metallic taste	5 mg/litre	0.01 LC_{50}
Copper	Liver damage	1 mg/litre	0.01 LC_{50}

Figure 3: Marator 6 test results

Sample	Result GC in mg/litre (Industry standard <5mg/litre)
NS 6-1	< 0.1
NS 6-2	< 0.1
NS 6-3	< 0.1
NS 6-4	< 0.1
NS 6-5	< 0.1
NS 6-6	< 0.1
NS 6-7	< 0.1
Average	< 0.1

Manufacturers are only required to meet the testing standards to sell product. There has been no natural drive to improve product performance.

The current class 1 standard of less than 5mg/ltr of light liquid is only determined by test conditions. Our experience in this field tells us that this standard is rarely met once a product is installed.

The reality of current standards

With the current level of 5mg/ltr for a Class 1 discharge – we ask "Are Class 1 separators the very best that manufacturers can offer?"

Studies have shown that the majority of hydrocarbon pollutants entering the water system stems from urban developments. Figure 2 shows the toxic effects of particular contaminants on humans and aquatic life.

Leaving aside the toxic effects of contaminants on human and aquatic life, when a hydrocarbon molecule spreads to one molecule thick and given enough surface area to spread, five litres of oil would be more than enough to contaminate five football pitches.

In addition, most hydrocarbon molecules are attached to silt particles; where Stokes law proves that these particles will sink rather than float as conventional separators require.

When mixed with other elements in real life scenarios, such as glycol, standard gravity separators become less efficient at contaminate removal.

In our view, the current testing standards covering products within the gravity separator market are outmoded and failing to protect the environment as they should. They do not reflect or address any 'real-life' scenario where hydrocarbon pollution is prevalent.

> "In our view the current testing standards fail to protect the environment as they should

The solution

Marsh Industries has developed an innovative separator system that breaks the constraints of the current standards; the 'Marsh:Marator'.

The Marator takes advantage of nanofiltration technology to produce discharge that is 50 times better than any current separator available on the market today; that is less than 0.1mg/ltr – the standard only requires less than 5mg/ltr for a 'class 1 discharge'.

Testing was analysed for hydrocarbon content using infrared spectroscopy at GEOTAIX UMWELTTECHNOLOGIE GmbHA.

During the sampling period, five samples of 500ml were taken via the sampling point. The quality of discharge from the Marator exceeded the measureable level of the test equipment not to mention the current EN standard:

Full testing is now complete for the entire Marator separator range and the products are undergoing their 'release to sale' process.

Outmoded EN standards are no longer an environmental concern when specifying the Marsh:Marator range.

Figure 4: Marsh:Marator full retention oil separator

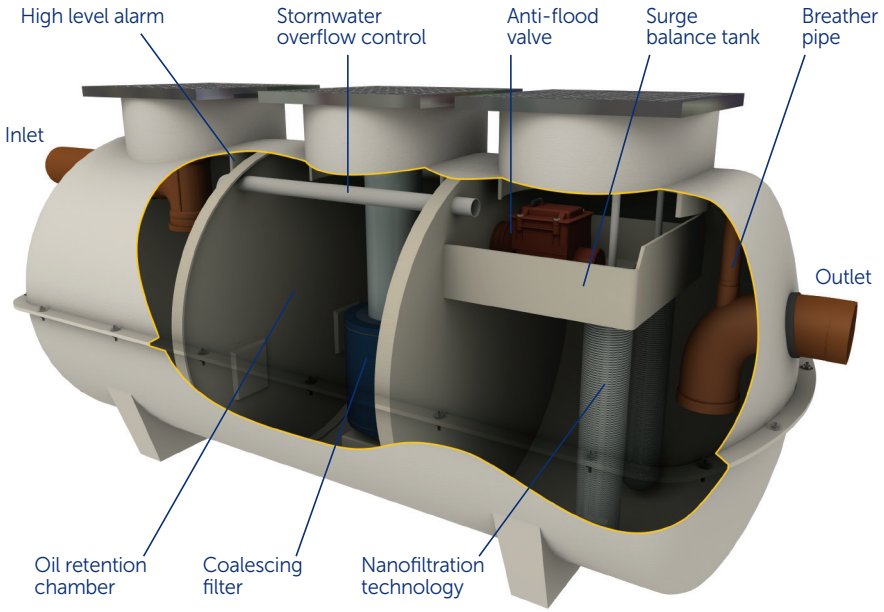


Figure 5: Marsh:Marator certification

PIA
Prüfinstitut für Abwassertechnik GmbH

PERFORMANCE RESULTS

Portapura Limited.
Irthlingborough,
Northants NN9, Great Britain

EN 858-1
Separator systems for light liquids (e.g. oil and petrol)

"Marator Separator"

Test report PIA2018-AB-1804-1026.01

Material	Glass reinforced plastic
Nominal hydraulic load	6.0 l/s
Nominal Size	6
Effluent	< 0.1 mg/l
Class	I

Performance 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. 1738 · Certified according to ISO 9001:2008 · DAkkS Deutsche Akkreditierungsstelle D-PL-17712-01-00

Daniel Verscheid · August 2018

Structural integrity testing
Structural integrity tests, performed in accordance with EN ISO 179-1/1eA: 2010-11, were undertaken to evaluate the strength of Marsh Industries' GRP materials against similar GRP materials used by other manufacturers.

Three separate material samples were submitted for impact testing; Marsh GRP material (virgin unfilled resin), a GRP material containing calcium fillers and a GRP material containing sand filler.

The tests involved 12 samples of each material at a size of 80x10x5mm. The nominal pendulum energy was 15J at an impact velocity of 3.8m/s.

Results proved Marsh GRP material to be 40% stronger than the other materials tested.

Fire resistant testing
Fire resistance testing was performed to assess ignitability of products subjected to direct impingement of flame. Marsh Industries' GRP material passed all practical testing to achieve EN ISO 11925-2:2010 standard.


PERFORMANCE RESULTS

Marsh Industries Ltd.
Irthlingborough Road, Little Addington
Northants NN14 4AS, Great Britain

EN ISO 179-1/1eA: 2010-11
"Plastics – Determination of Charpy impact properties; Part 1: Non-instrumented impact test"

"Marsh Material Specification"

Test report PIA2018-DH-1806-1035.01

Material	Glass reinforced plastic
Charpy notched impact strength	
- Resin	131 kJ/m²
- Filler	93 kJ/m²
- Sand	116 kJ/m²

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

PERFORMANCE RESULTS

Marsh Industries Ltd.
Irthlingborough Road, Little Addington
Northants NN14 4AS, Great Britain

EN ISO 11925-2:2010
"Reaction to fire tests – Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test"

"MiMMS"

Test report PIA2018-RF-1806-1034.01

Material	Glass reinforced plastic
Period of flame impingement	15 seconds
Number of tests	12
Height of flame	< 150 mm
Classification (EN 13501-1)	Class E

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MI-MARATOR-TECH-1218-A