

RBBR water recycling system for

CAR WASH WASHING 450 CARS PER DAY



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Advanced technology for car wash water recycling

The patented technology of the R4000 series is a guaranteed solution for water recycling in car wash lines.

Clewer's cleaning technology is based on a rotating bed biofilm reactor (RBBR), which provides you with the highest filling degree and the longest replacement interval of carrier material on the market.

The ecological Clewer system offers unprecedented savings: you can recycle more than 90% of the water. Fresh water is needed only for the final rinse.

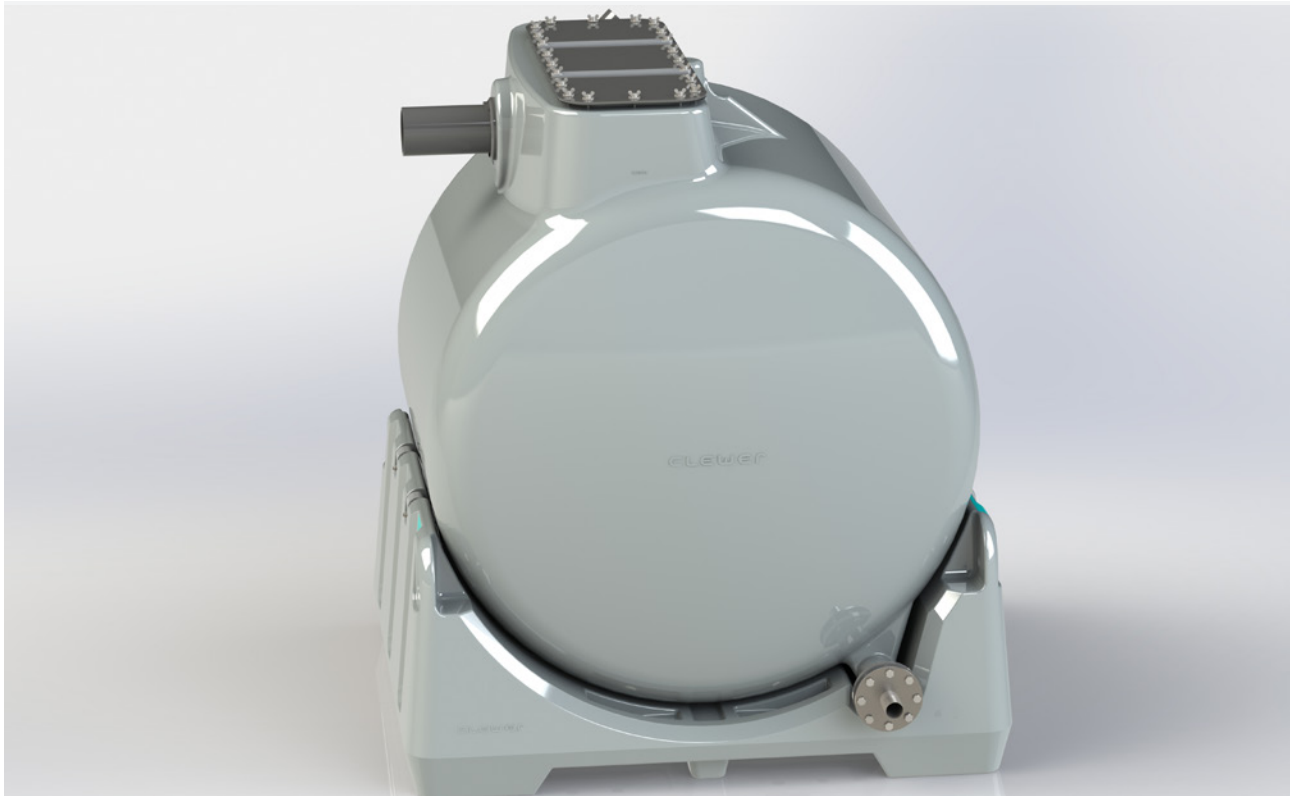
In addition, the RBBR keeps the tank clean without wear or friction. Thus, reactor maintenance can be carried out easily.

The water recycling equipment can be installed in existing car wash premises. Alternatively, the equipment can be packed into a container, which requires no space in the car wash interior.

Choose Clewer!

- Recycle over 90% of the water
- High-quality recycled water
- Simple to maintain
- Reliable
- Low maintenance
- Easy to install in new or existing car washes
- Scalable
- Eco-friendly, meets the requirements of the strictest legislation

Bioreactor R4000



Dimensions: 1,820x1,990x2,300mm (length x width x height)

Total volume: 4,1m³

Weight: 900kg

As much as 80% of the bioreactor volume is filled with carrier material. The carrier material provides a large surface area, in which the bacteria is able to grow.

The bacteria - a mixture of natural bacterial strains - will create a biofilm on the surface of the carrier material. The function of the bacteria is to break down the chemicals used in the car wash.

Air is blown into the bioreactor. It generates a rotating movement, which helps to oxygenate the water and keep the reactor clean. The RBBR technology is an effective and energy-efficient solution.

TECHNICAL DESCRIPTION FOR AUTOMATIC CAR WASH

RBBR system for car wash washing 450 cars per day

System components

Unit process	Device	Number of devices	Unit price, freight not incl.	Total price [€]
Biological filter	Clewer RBBR R4000	3	€13,600	€40,800
Aeration	Diaphragm blower	6	€494	€2,964
Solid-liquid separation	Lamella clarifier	1	€8,320	€8,320
Automation	Distribution central	1	€2,540	€2,540
Nutrient dosing	Dosing pump	1	€308	€308
Excess foam breaking	Clewer antifoam device	1	€700	€700
Water storage*	Clewer storage tank	1	€2,890	€2,890
			Total price [€]	€58,522

*Replaces the washing machines' old water storage tank

Not included on the standard package

Unit process	Definition
Plant building/room	Equipment has to be installed indoors in a suitable technical room
Sand separator/water buffer	Sand separator - Min. effective volume 15m³
Sludge storage	Sludge tank is optional for enhanced effluent metal removal - Final sludge volume for disposal will be approximately 7.5m³/year. Volume of the sludge tank depends on the emptying interval
Oil separator	Oil separator - Possible to use existing oil separator
Pumping	Submersible pump - 1 pc, flow 3.0l/s - Recommended to control the pump power by frequency converter
Consumables	Clewer CL-20 nutrient solution - Consumption approximately 30ml/wash
On-site piping work	Piping connections
On-site electrical works	Electrical connections
Cooling/heating	Cooling/heating system (cold/hot climates)

Containerized package

Unit process	Device	Number of devices*	Unit price, freight not incl.	Total price [€]
Plant frame	20' container (insulated, heated, alight)	2	€13,500	€27,000
Installation + accessories	Components installed to the containers	1	€8,200	€8,200
Containerized buffer tank*	20' container (insulated, heated) + 15m³ buffer tank	1	€12,240	€12,240

*Required for the composition mentioned in System components table **If existing system does not have enough volumetric water buffer capacity

Power consumption

Device	Function	Power
Submersible pump	Water recycle	~2,4kW
Air blowers	Aeration of the RBBR	1.5kW
Antifoam	Excess foam breaking	0,4kW
Chemical pump	Nutrient dosing	0.015kW
Total continuous power demand		4.3kW

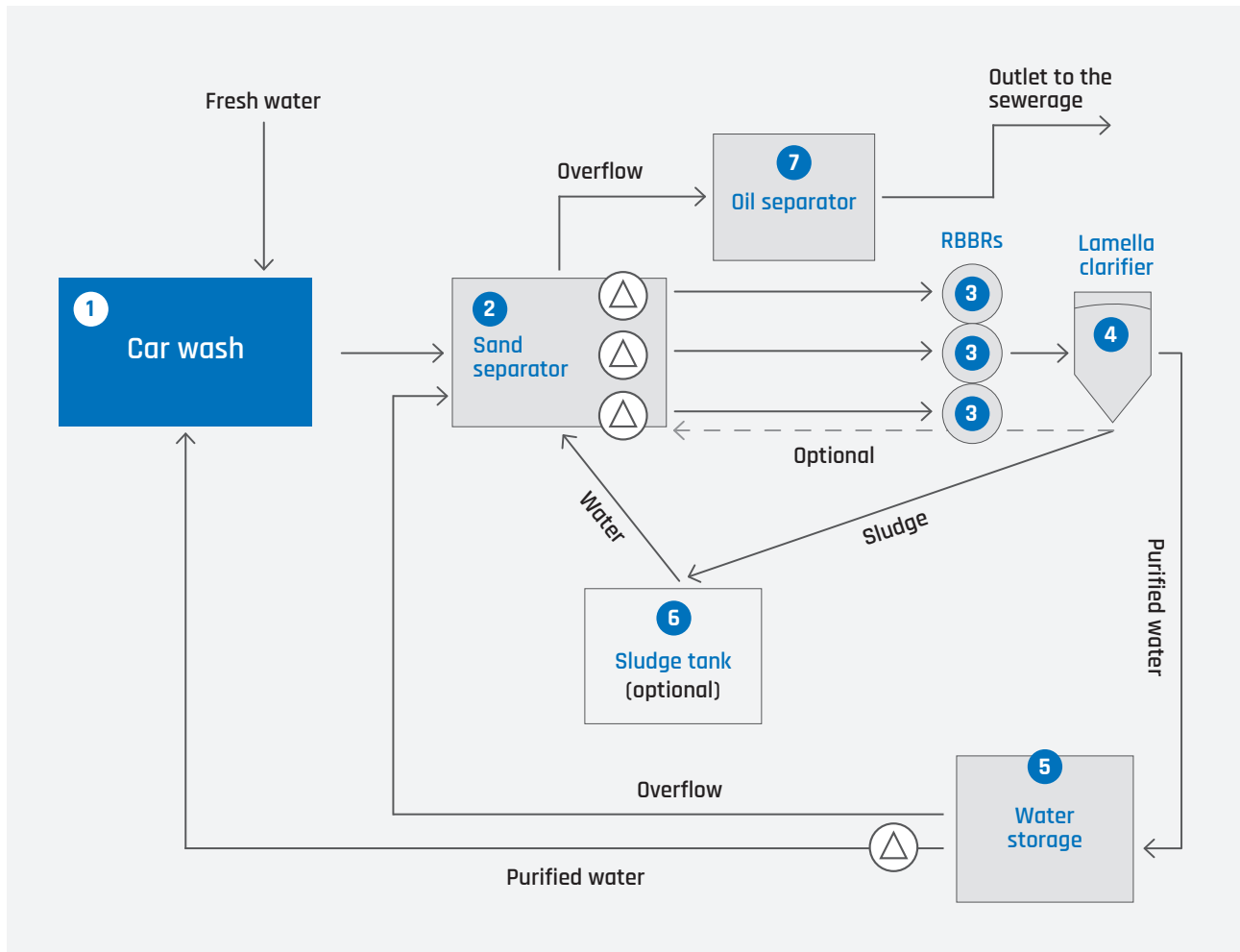
Consumables

Nutrient for the microbes	Consumption approximately 30ml/wash (list price €2/l)
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Maintenance

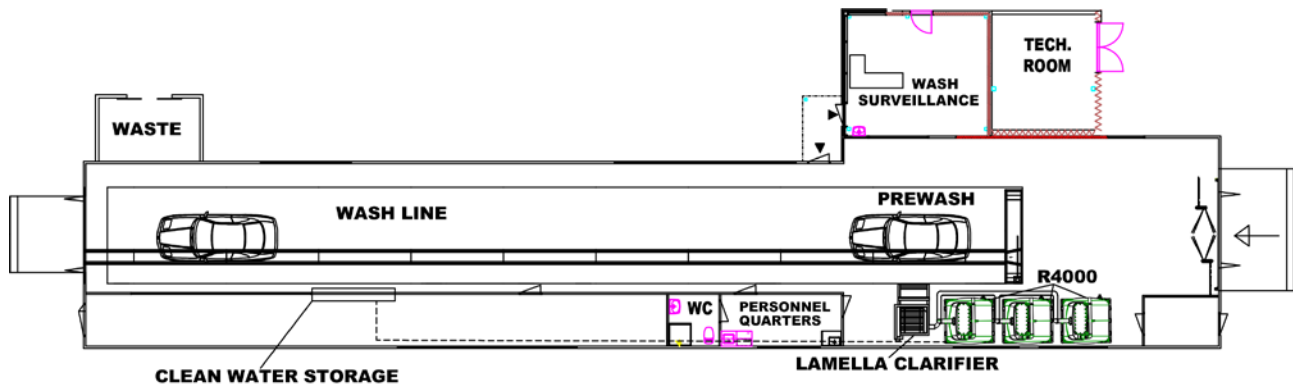
Procedure	Performed/year	Working time
Cleaning of the aerator pipes	Every 3-5 years	1 1/2 hours (draining the reactors ~1 hour)
Cleaning/changing the air blower filters	Every three months, depending on the indoor air quality	1 1/2 hours
Chemical refills	According to storage volume, consumption approximately 30ml/wash	1/2 hour
Sludge removal	According to sludge tank volume	1-2 hours

Overview of the operation

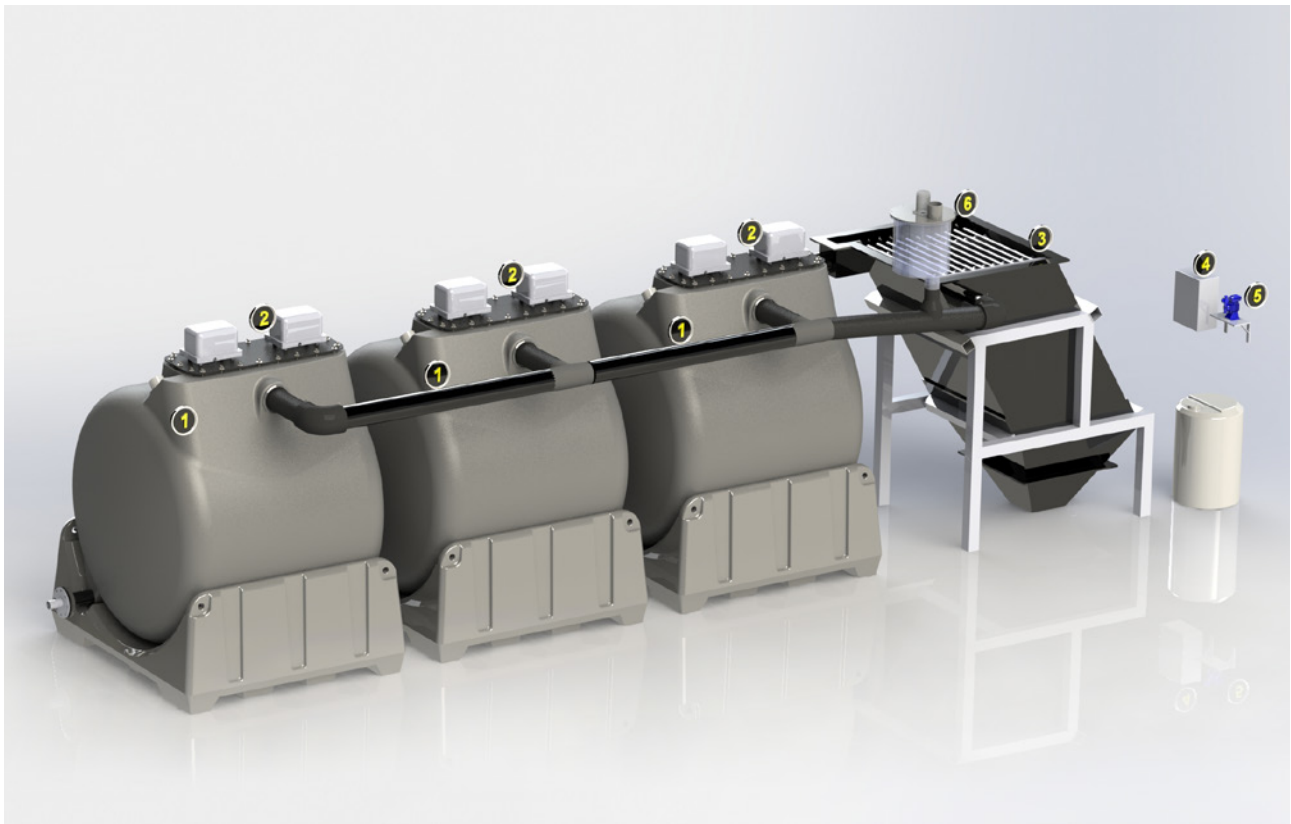


1. Cars are washed.
2. Water from the car wash flows to sand separator.
3. From sand separator, water is pumped to RBBR units (Clewer R4000), where biological water treatment takes place.
4. From RBBR, water flows to the lamella clarifier, where dead biomass and other solids are separated from the water.
5. Purified water flows to the water storage, ready to be used in the car wash again. Excess water is recycled back to the sand separator, and again into the treatment process. Recycle loop maintains treated water in the system.
6. Sludge is removed from the bottom of the lamella clarifier, and directed into the sludge tank. In the sludge tank, sludge will thicken at the bottom of the tank. Reject water is directed back to the sand separator.
7. Replaced water overflows from sand separator through the oil separator and into the sewerage system.

Floor plan



3D picture of the components



1. Biological filter 2. Aeration 3. Solid-liquid separation 4. Automation 5. Nutrient dosing 6. Excess foam breaking

Application form example

The entire application form is available at <http://www.clewer.com/car-wash-waste-water-treatment/application-form/>.
 The form can be filled out and sent electronically.

Inquiry information

Project name	Eco Wash
Project location	Cleantown

Process information

Washing technique	automatic
Washed vehicles	Trucks
Washed vehicles (Other)	Buses

Process information

	Min.	Max.	Avg.
Washes per day	350	450	300
Location air temperature	4 Celsius	32 Celsius	12 Celsius

Wastewater effluent requirements (Additional documents attached)

Temperature (°C)	Max. 34 Celsius
pH	6-9
Metals	E.g. Copper max. concentration 0.3mg/l
Other compounds	E.g. PAH-compounds, oils etc
Comments and misc	E.g. space requirements etc.

References



Water recycling system for a car wash, Hesepesu, Martinlaakso, Finland, 2011

About 90% of car wash waters on an automatic line is recycled.
An average of 30,000 washes/year.



Water recycling system for a car wash, Hesepesu, Turku, Finland, 2012

About 90% of car wash waters on an automatic line is recycled.
An average of 28,000 washes/year.



Water recycling system for a car wash Vaasan Käyttöauto, Pori, Finland, 2012

About 90% of car wash waters on an automatic line is recycled.
An average of 10,000 washes/year.



Water recycling system for a car wash, Neste, Kaarina, Finland, 2013

About 90% of car wash waters on an automatic line is recycled.
An average of 30,000 washes/year.



Clewer provides ecological wastewater treatment systems for industry and communities worldwide. We create environmentally friendly solutions for more efficient water recycling around the world.

Industries - Cities and communities - Single households
- Modern wastewater cleaning and recycling

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