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Industrial water treatment using a modular system

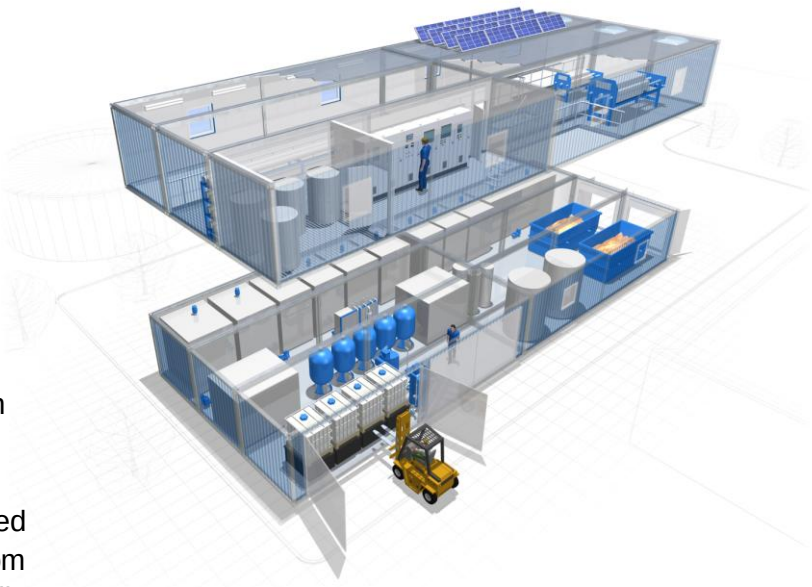
Plants for industrial water processing and wastewater treatment designed using a modular approach have an advantage in a global implementation strategy.

The German company, EnviroChemie, head quartered in Rossdorf has been developing, manufacturing and installing systems to clean industrial wastewater, circulate water and condition process water for over 35 years. Its engineers and technicians have always applied a decentralised solution and developed custom designs for customers and for sectors. As well as fully individually manufactured system solutions, from the early days compact standard ready-made systems were also implemented. Depending on customer requirements the water and wastewater processing challenges are resolved using one of the company's proprietary biological, chemical-physical or membrane technology solutions.

In 2008 the company started developing the EnviModul system. The construction of the existing processes on offer was modified so that they fit into the pre-fabricated, high-quality space modules and can be combined in many different ways. An EnviModul component replaces operational buildings constructed from steel and concrete, is semi-mobile, adaptable to different climatic conditions, durable and visually attractive.

Construct and reconfigure rapidly

Compared with conventional plant construction, modularised solutions can be implemented significantly faster and at a lower



EnviModul plant for chemical-physical wastewater treatment in a two storey version.

cost. They can be adapted more easily to variable operating conditions at customer sites. And where required, they can be relocated to other operating facilities.

Decentralised solutions for treatment of wastewater and process water or for water recycling are customised to meet operating requirements and configured individually. Detailed, basic empirical information about the flows of materials, such as where they arise, what they contain and their concentrations, are just as important as the exact determination of the quality of water or substances to be produced. Official requirements for the issue of permits must be taken into account. Depending on these requirements, the EnviroChemie experts select the most suitable processes and steps within processes, combine them and size them. The process stages are then configured and designed using the necessary number and sizes of modular cells. Depending on the plant

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	Conventional design	EnviModul component system
Planning time	long	short
Approval	building permit very complex	building permit very easy
Building costs	high	low
Assembly time	medium	short
Commissioning and testing	all on site	pre-tested in factory
Expansion	often limited	easily possible
Changes	expensive	easily possible
Plant moving	no	possible
Depreciation	long	short

Comparison of conventional plant construction and EnviModul component solutions

single modules between three and twelve technology required and the size of the plant, the EnviModul system components can be metres in length, which can be transported in their finished state by lorry, double components which are transported in sections, or complete buildings, which may consist of up to 20 modules.

Components with solid individual elements

The construction of the module cells is based on corrosion-resistant steel frames with several coats of paint and ISO corners for easy transport. The modules are insulated on all sides and feature plastic-coated inner lining. For the floors, various design options in steel, plastic or gratings are available. Modules housing media have a 100 mm high watertight floor tray. Windows with insulated glass or light domes can also be fitted where required. Heating and climate control is available to suit regional requirements. The roofs of the modules can simply be opened or moved back to enable the easy maintenance and care of dip moulding membranes in membrane filter systems or membrane biologies. In a frost-free environment, the housing modules are open at the sides and are erected without any wall coverings. This solution saves costs and facilitates operation and maintenance. As a general rule, the plants are loaded using a truck-mounted crane and - just like prefabricated garages - set on deep foundations, strip foundations or concrete slabs.

Part of an EnviModul wastewater treatment plant.

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Factory assembly and acceptance

EnviModul plants are fully designed and built by EnviroChemie in Germany. They are then also assembled at the factory as required by the final installation for initial testing. Generally the company invites the client to be present during testing. They can still ask for minor changes and adjustments at this point.

This complete pre-assembly improves the quality of the compact systems considerably compared to local erection and assembly. And the customer can also relax with the reliability and certified quality work of the "Made in Germany" label.

Application examples from around the globe

The following are genuine examples of applications: A producer of body care products uses EnviModul wastewater treatment plants for their production locations in Romania, China and Indonesia. It is important for the customer to have the same standardised plant technology at all locations. That is easy to achieve using EnviModul components. Another advantage for him is the rapid implementation of projects on site, thanks to the modules leaving the works in Germany ready to use. For his planned production expansion he can simply add on any additional modules which are needed.

A manufacturer of aromas and flavours decided to implement an EnviModul wastewater treatment plant with a sludge dewatering module, because he was able to install a space-saving solution in his plant very rapidly, without having to construct a dedicated building for it. At the same time, for the future he will be able to decommission an existing and costly pre-treatment stage for his industrial water, because EnviModul has integrated an optimised chemical-physical wastewater treatment stage in the modules.

For another customer, plants were supplied in Italy, Holland and South America using the EnviModul component approach. In this case the standard membrane cleaning module produces clean water. The individualised EnviModul plant approach was installed in several locations with some site specific adaptation.

Internal view of an EnviModul wastewater treatment plant.

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Summary

Modular EnviModul plants are built and tested in full by Envirochemie in Germany. They are quick to implement, it is easy to adjust their capacity and they are not subject to the variations in quality which occur with locally constructed individual solutions. The customer gains in terms of time, flexibility and reliable quality.In future, many industrial customers will specialise and focus on their core competences. The number of production locations worldwide will grow. These production locations will be structured to be more uniform in terms of their technology and organisation, and will be subject to consistent environmental standards across the company. Standardised plant solutions, like modular plants, can be supplied anywhere in the world.

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