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SUSTAINABILITY FACTSHEET #07

Sustainable Water Treatment and Recycling in Clay Brick Production

Rain water, storm water, grey water, ground water and water reclaimed from manufacturing processes can be treated and reused.

Technical Contributors

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In the brick production process, recycled waste water can be used during extraction of the clay, mixing and kneading as well as in the factory buildings for purposes such as toilet flushing.



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EXECUTIVE SUMMARY

Depending on the nature of water pollutants and end-use requirements, three waste water treatment methods can be used. These are physical, biological and chemical methods. The most feasible water treatment methods to recover water for production processes are the physical and biological methods and these are discussed below. The chemical methods are primarily used to recover waste water for high quality applications such a pharmaceuticals.

BIOLOGICAL: ANAEROBIC METHOD

This method uses micro-organisms to treat waste water using similar naturally occurring processes (Department of Sustainability, Environment, Water, Population and Communities, 2010).

Oxygenated air is pumped through lightly contaminated waste water in biological reactors. It is an advantageous method to adopt because large quantities of waste water can be recovered at a relatively lower cost and it is easy to implement. Also, some of the by- products of this process such as methane yield energy and the sludge can be used as a raw material in brick making.

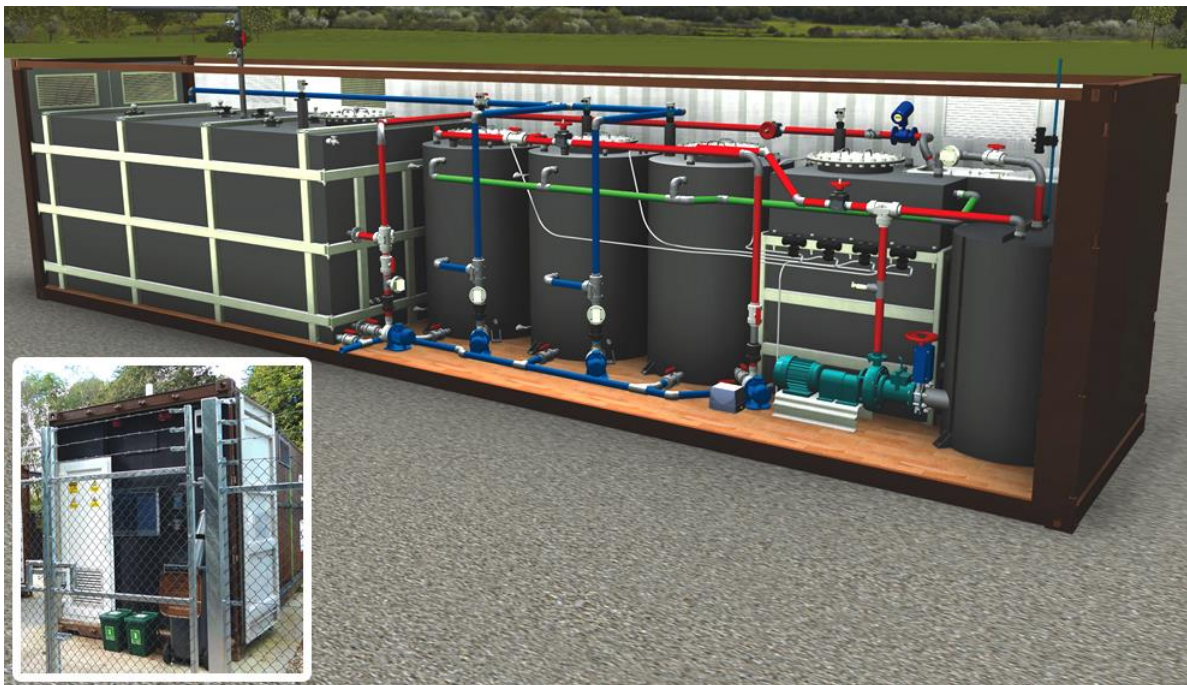


Figure 1 Compact Anerobic reactor by SEaB Energy. Source, Riggle, 2013.



PHYSICAL

Floatation and basic infiltration

This method removes grease, oil and suspended solids. It is a relatively cheaper and easy method and is commonly used in general industrial waste water effluents and in kitchens to remove grease and food particles.

Membrane filtration

Pressurized waste water is forced through a semi-permeable membrane to remove solids and dissolved salts. Some advanced forms of membrane filtration such as reverse osmosis and nanofiltration can remove dissolved salts, dissolved solids as well as organics and pathogens (Department of Sustainability, Environment, Water, Population and Communities, 2010). These methods can be used to recover grey water from faucets, showers and dishwashers on the factory sites.



Figure 2 Compact MBR for grey water treatment.
Source: Lenntech, 2018.

Combined physical and biological

This method combines biological processes and membrane technology in Membrane Bioreactors (MBR) to produce a high standard of water treatment. The resultant water can be used within the production line as well as aquifer replenishment.

SOURCING EXTERNAL INDUSTRIAL WASTE WATER

An example of a local company that is successfully incorporating effluent water in its production chain is Claytile (Pty) Ltd in the Western Cape. Even if it is locally recycling its waste water onsite, it also sources approximately 250,000 litres of effluent water from an old refinery.

This water is used to wet clay before extraction and the small quantities of residual oil act as a lubricant and thus reduce the amount of energy consumed by the extruder (CBA, 2017). In this way, the company is able to save on the same amount of water per week that would have been sourced from mains or other portable water sources.



CONCLUSION

On site grey and waste water treatment is a good practice in recovering water from the production process as well as on the production sites which would otherwise have been channelled away to municipal sewerage plants. The treated water can also be directly re-used in production and other non-potable water uses such as flushing toilets thus saving on the potable water needs and over-dependence on the mains. Most of the technologies for waste water treatment exist and have been adopted by different industries as well as municipalities.

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For further information:

The Clay Brick Association of South Africa

Website: www.claybrick.org