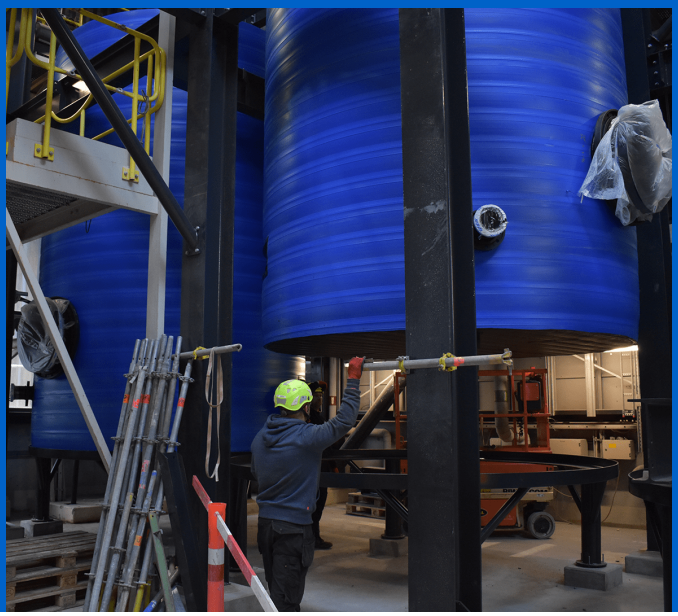
References

Uponor delivers tanks for a ground-breaking development project at Vestforbrænding



Uponor involvement

- 10 x Ø3000mm, 3 x Ø2400mm, 1 x Ø2000mm and 3 smaller tanks

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The circular economy, recycling and sustainability are keywords in the Uponor mission. Uponor will take part in projects that make a difference to people, society and the environment. For this reason, Uponor is proud to have delivered tanks to a new facility at Vestforbrænding, which converts toxic fly ash into recyclable materials using Halosep technology.

In Denmark we burn waste to create energy. It is an old tradition, combining the incineration of non-recyclable waste with energy production. When waste is burned in a large furnace, hot smoke is created which heats water.
The steam drives a turbine and generates electricity and the hot water is also used for district heating.

Vestforbrænding is Denmark's largest waste company. Ever year the waste incineration plant in Glostrup burns 500,000 tonnes of waste for the benefit of the 80,000 people in the area that receive electricity and the 75,000 households on district heating.

When you burn waste you create energy and electricity, but also a very dangerous residual product in the form of ash, called fly ash. In particular, the ash's toxic salts and heavy metals make it hazardous to humans and the environment. Therefore, fly ash – according to EU rules – must be deposited in special secured landfills within or outside EU borders. A total of 15,000 tonnes of toxic fly ash are deposited each year from Vestforbrænding alone.

But now it is no longer possible to send large quantities of hazardous waste out of the country. Instead, cutting-edge technology is to remove the dangerous elements from fly ash, so that the ash goes from being hazardous to harmless. That technology is called Halosep, and it was invented between 2003 and 2007 by the Danish company Watech. Halosep was later bought by the Swedish operation Stena Recycling, which has developed the technology and tested the process at smaller experimental plants. Now, Stena Recycling, together with Vestforbrænding, has built the world's first full-scale Halosep plant, putting the technology into practice.

Project Facts:

Location	Completion
Glostrup, Denmark	2020
Building Type	Product systems
Industrial	Tailor made constructions
Project Type	
New building	

Partners

Building owners: Vestforbrænding
Halosep technology: Stena Recycling
Weholite tanks: Uponor Infra A/S

Zinc, lead and cadmium can be sold for recycling in industry, and the salt is so pure that it can be used as road salt

At the Halosep plant the hazardous fly ash, together with oxidising agents from the flue gas purification, is converted into non-hazardous ash and recyclable materials. This means that much less toxic waste has to be transported to landfill in the future. In the Halosep process, 80% fewer chemicals are used than were previously utilised to treat fly ash and oxidising agents. This benefits the environment. But the revolutionary thing about the Halosep process is not only that you can now rid the fly ash of toxic substances with fewer chemicals, but also that the substances which are removed from the ash can be recycled and reused. The metals such as zinc, lead and cadmium can be disposed of for recycling in several places within the industry sector, and the salt has become so pure it can be used as road de-icer in the winter.

The fly ash is therefore not just cleansed; the residual products can also be recycled. In addition, through the Halosep process, the total amount of ash is reduced by 40%. Right now, at Vestforbrænding, they are testing ways of utilising this cleaned ash, as well as using the metals and salts. It can therefore be expected that a useful purpose will also be found for the pure ash. This ash is very fine-grained and, as a result, it can be incorporated into good construction material. It could be as a filler in concrete or cement, and it will have yet another environmental benefit, as it can help to lower the concrete and cement industry's CO_2 emissions.

Halosep technology has been integrated into the existing framework at Vestforbrænding. It has always been the goal of the Halosep developers to improve the incinerator plant's existing conditions so that no new buildings are needed. This helps to reduce resource consumption when installing the technology.

At Vestforbrænding they are highly satisfied with the new plant and the prospect of no longer having to dispose of large quantities of hazardous waste in the form of toxic fly ash. The project is considered as part of the development to constantly make optimum use of the power plant's processes:

- We not only have a responsibility to burn waste and supply electricity and heat to people, we also have a responsibility to

limit our environmental impact and to optimise the way we use our resources. We constantly strive to make things better by implementing new technology and making the most of operations, claims Samuel Moore at Vestforbrænding.

At Stena Recycling there is great potential for taking the Halosep technology further to several waste incineration plants in Denmark and the rest of the world:

- We have high expectations for Halosep's distribution and we are also experiencing increasing interest from other waste incineration plants. We have just started a similar project in Norway, where fly ash is being processed for recycling instead of landfill, notes Erik Rasmussen, Project Manager for Stena Recycling.

- Uponor is the supplier of all of the 18 tanks used in the Halosep process at Vestforbrænding. They are, among other things, reaction tanks, where many of the purification processes take place, mixing tanks and tanks for storing the purified ash. Since the Halosep process includes several strong chemical compounds, the choice of materials was very limited, states Project Engineer Bent E. Rønfeldt at Uponor Infra, adding that:

- The Weholite tank was the obvious choice, since this PE material can withstand most acids and bases. The material is easy to work with and there's no problem in assembling connecting pipes and installation equipment. In addition, it has been easy to make adjustments on a continual basis, since you do not depend on special tools or moulds. The close cooperation between Stena Recycling, Vestforbrænding and Uponor has meant the delivery of the tanks has amounted to an easy 'plug-and-play'.

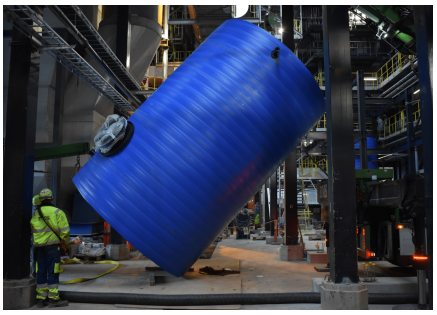
As supplier of the tanks for the Halosep plant, Bent E. Rønfeldt is pleased that Uponor is contributing to a significant reduction in the amount of hazardous waste from power stations:

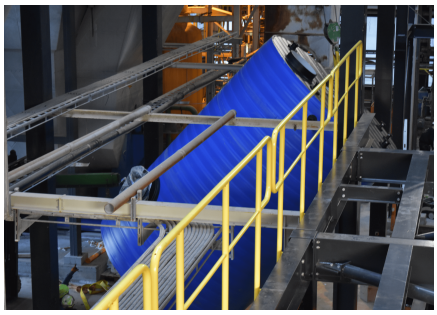
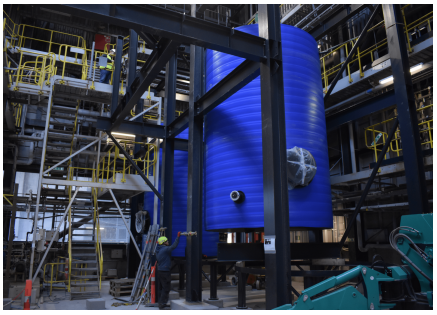
- Circular economy, recycling and sustainability are the keywords in Uponor's mission. Uponor will take part in projects that make a difference to people, society and the environment. For this reason, Uponor is proud to have been a part of the thought process behind this ground-breaking project, Rønfeldt concludes.

The plant will start up in 2020, and it will then run for one year as a development and demonstration project. After that Halosep will become a standard fixture at Vestforbrænding. Halosep technology possesses great potential in relation to the environment, and the individual waste incineration plants are looking for financial gain. It simply makes good business sense to cleanse the fly ash and sell the metals. Vestforbrænding expects that chemical savings and the sale of metals will bring in 1.5 million annually. Furthermore, you save money on not having to deposit large amounts of hazardous waste. The investment in Halosep is scheduled to make a return after six to eight years.

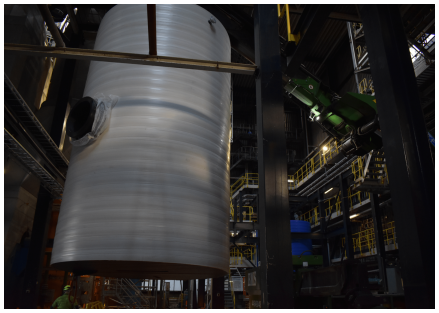
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