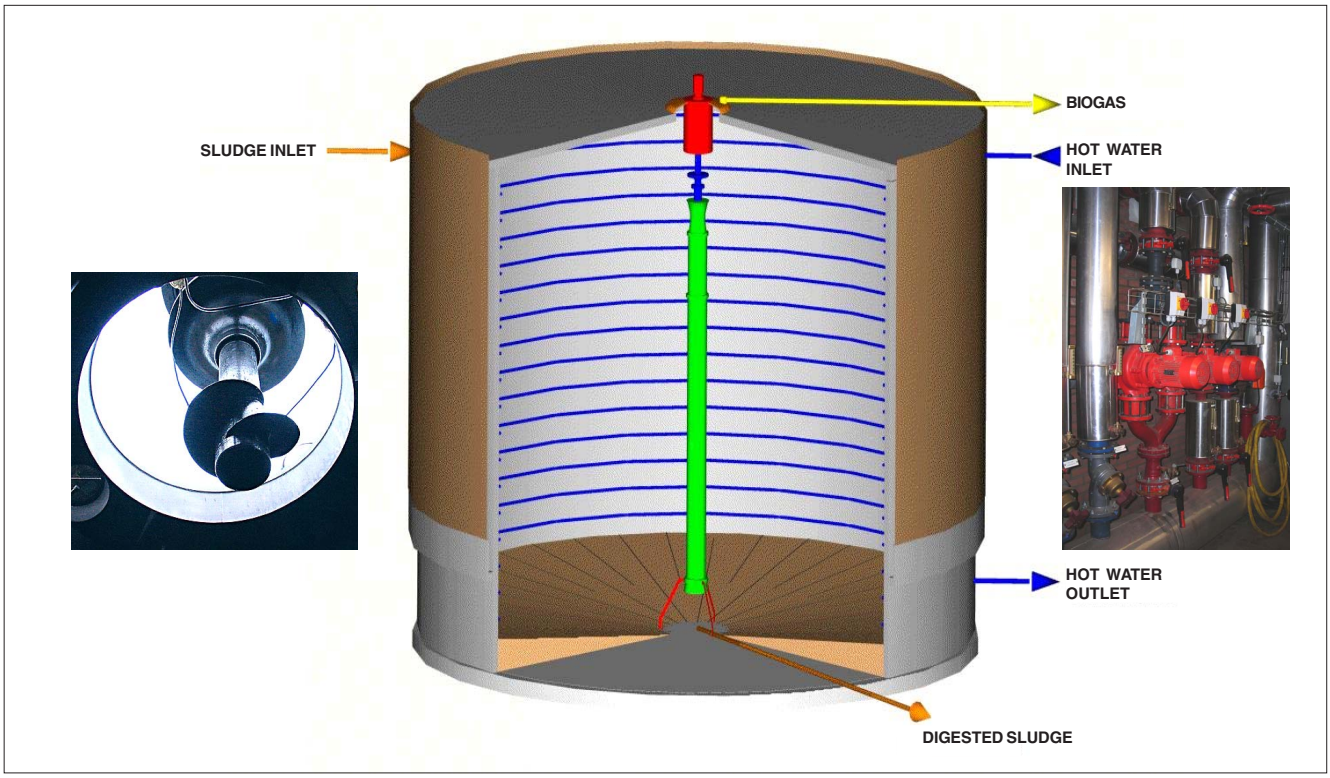

Columbus®

The future for sludge digestion

Presently there are about 90 sludge digestion facilities in operation in Dutch sewage treatment plants. There is a great deal of interest in utilizing the capacity of these facilities as much as possible in order to maximize the amount of green energy produced (Kyoto). This means that the sludge to be digested is thickened substantially before being fed to the digester. In practice, the existing mixing systems do not perform properly at these higher sludge concentrations. The 'Columbus®' concept, designed and patented by Royal Haskoning, has been specially developed to enable the problem-free operation of the digestion process at higher sludge concentrations.


Koninkrijk der Nederlanden

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Octrooibewijs

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HASKONING Nederland B.V. te Nijmegen.

Uitvinder(s): Bernardus Johannus Maria Bisseling te Nijmegen.

voor: Vergistingsreactor.

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Octrooicentrum Nederland

D.H. de Haas

OCTROOICENTRUM NEDERLAND

Columbus®

During the development of Columbus® there was a specific focus on good mixing and stable sludge digestion at higher dry solids contents. Columbus® is different from existing sludge digestion technologies because of its new mixing and heating method. It prevents many existing problems, such as foaming and scum layers, sedimention and clogging of inlet and outlet, and irregular gas production. Columbus® can be used in new facilities and also when existing digestion tanks are being modified.

No sediment deposition

Most digestion tanks in the Netherlands are cylindrical with a flat bottom. Homogeneous mixing down to the bottom of the tank cannot be achieved by gas injection through gas lances. The use of gas lances

ROYAL HASKONING

thinking in all dimensions

A Haskoning Nederland B.V. reference
WAT-WCH-D0011E1-NIJ-0208

provokes sedimentation, which can reduce the effective volume used for digestion by as much as 30%. In Columbus® the sludge is discharged from the centre. Together with the mixing system this guarantees that 100% of the volume remains available for digestion.

No scum layers
The content of the sludge digestion tank in Columbus® is kept homogeneous by a central riser containing a screw pump with an open, non-clogging design. This prevents the occurrence of the hard, dried scum layers that are found in conventional sludge digestion and which are difficult to remove.

Redundant equipment

Redundant equipment

No foaming
In conventional sludge digestion gas injection produces bubbles, which not infrequently results in foaming. This may result in the shutdown of the CHP plant. This problem does not occur in the Columbus® concept.

Heating
The heating principle has also been improved. The well-known external heating problems are a thing of the past thanks to the use of internal heating by means of a heating coil or an immersed system. Moreover, this approach to heating results in considerable energy savings, which can be as high as 60%.

Redundant equipment

Lower energy consumption, greater safety
The utilities associated with conventional sludge digestion consume huge amounts of energy. Sludge recirculation and gas blowers can easily require a capacity of 50 kW. The peripheral equipment in Columbus® has been strictly minimized, resulting in much lower energy consumption.
Safety-related risks are also reduced because long gas pipes and gas locks are replaced by one machine on the roof of the tank.

Sludge digester

References
Columbus® combines existing proven technologies. The mixing principle and construction method are widely employed in Germany. The heating method is established technology in the process industry. References can be sent on request. Royal Haskoning has mixing models (CFD) to verify the feasibility of Columbus® for your sludge digestion facility, whether it's new build or the modification of an existing one.

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