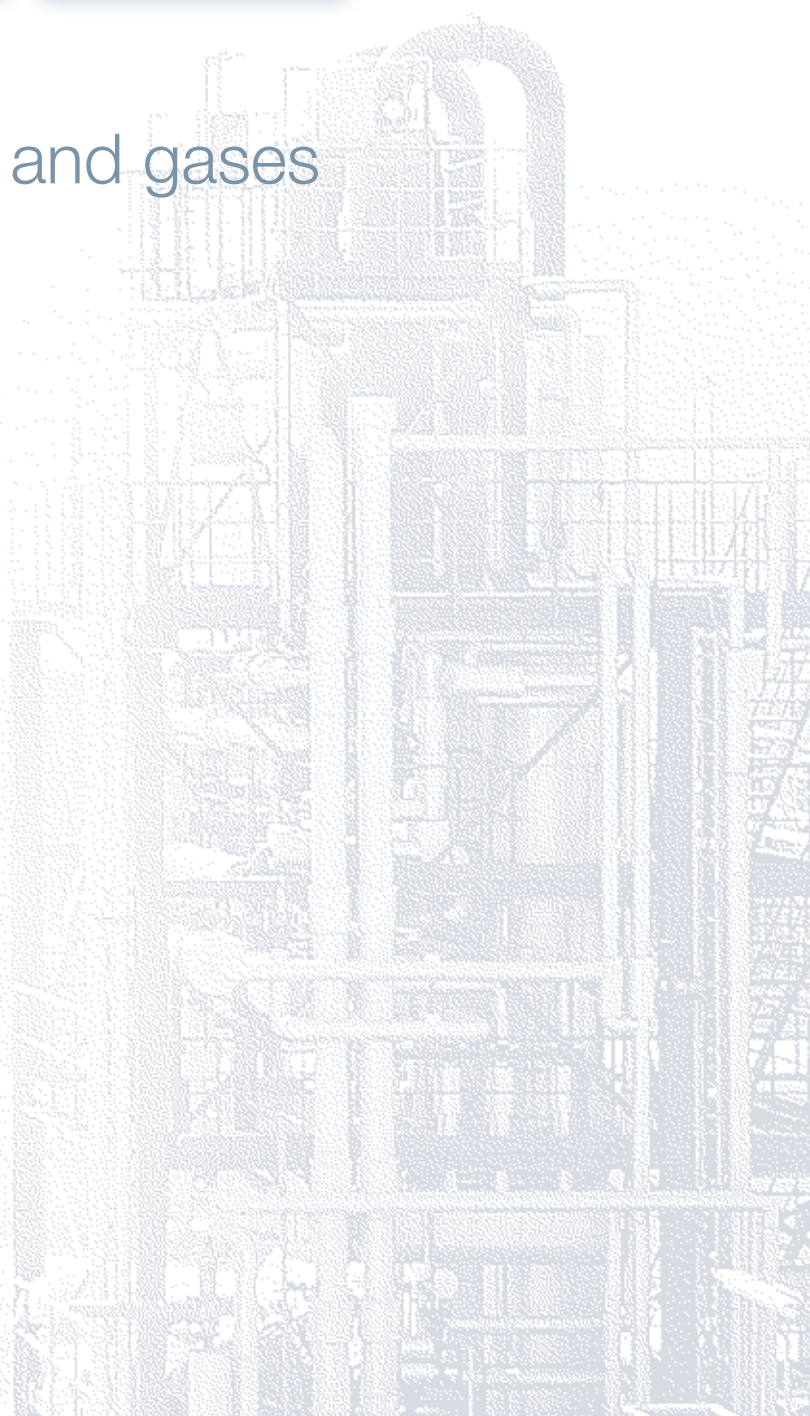




Ammonia recovery

Removal from liquids and gases



Steam and air stripping

Recovery of ammonia

Problem definition – Problem solution

Industrial and municipal wastewater streams as well as effluents from biogas plants often contain high concentrations of ammonium-nitrogen. Stripping with air or steam is a proven technology in terms of the treatment of ammonia-laden liquid streams. High solid loadings and corrosive contaminants demand for a high performance of a recycling plant.

Our ammonia recovery units offer advanced and economical solutions.

Our scope of supply includes waste water treatment and the ammonia stripping up to the production of marketable products.

From project planning up to start-up of the plant RVT Process Equipment offers all services and equipment from one source.

The process

Pretreatment

Ammonia is only strippable in a caustic solution. By addition of NaOH or limestone, the pH value is raised allowing the ammonia to be dissociated.

The use of NaOH allows for simple equipment construction and maintenance free operation. One disadvantage, however, are higher operating costs.

Lime is a significantly less expensive alkalisating liquid. Using lime, the alkalisating process is slow and demands more technical equipment. The pH adjustment is achieved through multiple mixing operations in a stirred tank reactor. During this operation flocculation of insoluble inorganic components like carbonates, phosphates and sulfates takes place.

Solids are either conveyed through the entire process or in some cases, separated after the alkalisating in a further process step.



System to alkalyze influent stream with limestone.

Ammonia stripping

The actual separation process is achieved in a random packing column.

The influent stream is introduced at the top of the packed bed and flows down through the column. In countercurrent to this, air or steam flow up and strip ammonia from the liquid phase. Ammonia-laden off gases exit the top of the column and treated water is collected in the column sump.

Key parameters for the decision whether air or steam stripping should be used and how the entire process should be designed are as follows:

- Local conditions
- Wastewater stream temperature
- Ammonia content
- Energy source
- Economic usability of end product is featuring a higher efficiency

Air stripping in general causes lower operating costs and does not require any steam and cooling water sources.

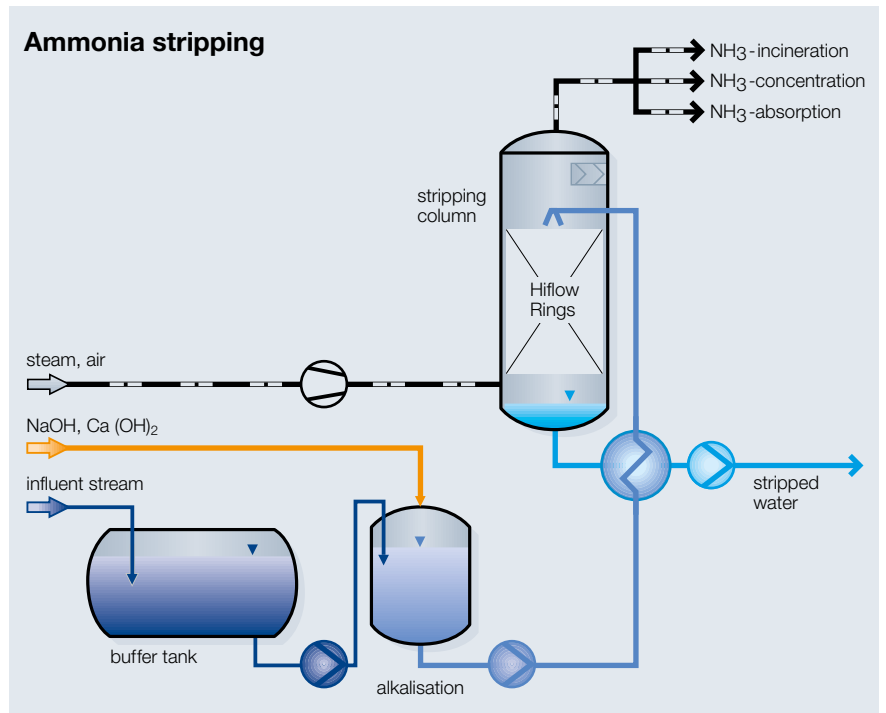
Off gas treatment

Various possibilities exist for the treatment of off gases including recovery of ammonia water, absorption and combustion.

Steam stripping allows for the off gases to be concentrated in a subsequent distillation column. This process is energy intensive but operates without residuals. The economically usable end product is ammonia water (appr. 20% NH_3). The purity of this product allows its reuse in Denox units, for example.

In air stripping, the ammonia containing off gases can be discharged either by combustion or by absorption in an acid scrubbing process.

In the scrubber stage ammonia is absorbed by sulfuric acid. The end product is a concentrated salt solution which is mainly used as liquid fertilizer.



Ammonia recovery by air stripping.





Steam stripper with integral rectification section.

Our experience for your problem definition:

- Complete solutions in high-tech and compact design.
- Turn-key delivery beginning from basic engineering up to start-up operation.
- High separation levels.
- Low gas-side pressure loss and low energy consumption.
- Flexible load reaction and low sensitivity to partial loads.
- Particularly suitable for highly contaminated waste liquids and gases.
- Insensitive to fouling and proven design for practice.
- Minimum service and maintenance demand.
- Fully automatic plant operation.
- Recyclable process products.



Air stripper for the treatment of reject water at a wastewater treatment plant.

Absorption of ammonia from waste gases

Separation and recycling of ammonia from liquids and gases

Among the systems for the recycling of ammonia from waste water we are offering scrubbing systems for the removal of ammonia from waste gases. The alkaline gas component is being separated by means of a chemical scrubbing process with sulphuric acid and can be used as a liquid fertilizer.

In some cases for cooling purposes the gas has to be quenched down to the saturation temperature by evaporation of water before entering the scrubber.

In case the ammonia concentration of the raw gas is really high the water circuit will be equipped with a heat exchanger for the removal of the heat coming out of the exothermal absorption process.

Our performance

For complex customer requirements RVT Process Equipment offers complete hightech solutions that have proven successfully under practical conditions.

Automatic flushing cycles prevent any incrustations and allow an operation with a low maintenance demand. This results into the high availability of our plants.

Our main focus is on the recovery of potential recyclables. We can assure the recycling of the process products. Our systems are working without producing residual materials.

Following details are required for preparation of quotation in accordance with your special demands.

Steam/air stripper

- Liquid flow rate
- Temperature
- Ammonia concentration
- pH value
- Other ingredients
- Quality of final product
- Quality of outflow
- Auxiliary energy sources
- Special requirements

Ammonia scrubber

- Waste gas flow rate
- Water content
- Gas composition
- Temperature
- Pressure
- Clean gas quality required
- Special requirements



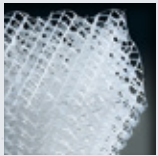
We are a certified and approved specialised company according to § 19 of the Water Resources Management Act (WHG).

RVT Process Equipment has been certified according to ISO 9001 since 1996, and according to ISO 14001 since 2010.

The way to RVT Process Equipment



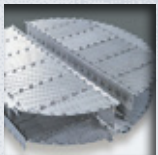
Tower packings for mass and heat transfer



Structured packings for mass and heat transfer



Column internals



Mass transfer trays



Biological carrier media



Turn-key units for waste gas scrubbing



Ammonia recovery processes



Combustion plants for the disposal of exhaust air, waste gases and liquid media



Our addresses

RVT Process Equipment GmbH
Paul-Rauschert-Straße 6
96349 Steinwiesen, Germany

Phone +49 (0) 9262 77-0
Fax +49 (0) 9262 77-700
E-Mail info@rvtpe.de

RVT Process Equipment, Inc.
9047 Executive Park Drive
Suite 222
Knoxville, TN 37923, USA

Phone +1 (865) 694-2089
Fax +1 (865) 560-3115
E-Mail info@rvtpe.net

Kunshan
RVT Process Equipment Co., Ltd
No. 66 - 68, Shaojing Road
Development Zone Kunshan
215300 Kunshan
Jiangsu province
P.R. China

Phone +86 (512) 55 18 82 55
Fax +86 (512) 55 18 81 87
E-Mail hui.chen@rvtpe.com