THERMAL AMMONIA STRIPPING WITH AMMONIA RECOVERY

Cold water scrubbing

The Advanced Thermal Ammonia Stripper with Ammonia Recovery has been developed and patented by Organics to provide another option for disposing of, or benefiting from, ammonia removed from wastewater streams. The ATASAR process provides the option of either ammonia recovery as an anhydrous liquid under pressure, or as ammonium hydroxide, held in water. The thermal oxidiser is replaced by a cold-water scrubber. The single important input remains waste-heat with which to drive the chemical reactions. Heat is required for both heating the feed into the ammonia stripper, as well as to drive the absorption chiller serving the cold-water scrubber. Such waste-heat can be taken from any suitable source, such as a gas engine's exhaust, excess process steam or any other heat-source where energy is available for disposal.

Thermal stripping provides a very low cost alternative to the use of carbon-source addition in a biological process. In many instances savings can be measured in six digits USD when taken over the lifetime of a project.The thermal-stripper breaks the ammonium-ion bond with heat alone. This action converts ammonia into a gas, NH_3, which can be driven from the liquid-phase with suitable quantities of air. In a single pass it is possible to achieve greater than 98.5% removal of ammonia by this mechanism.

KEY FEATURES

AMMONIA REMOVAL WITH HEAT ALONE

NO REQUIREMENT FOR CARBON SOURCE ADDITIONS

HIGH-RATE AMMONIA REMOVAL WITH NO ADDED pH ADJUSTMENT CHEMICALS

SINGLE-PASS SYSTEMS CAN ACHIEVE > 98.5% AMMONIA REMOVAL

MINIMAL AIR MOVEMENT COSTS

MINIMAL PLANT FOOTPRINT: REMOVAL RATES OF UP TO 840 kg NH^4-N/m^2/day

ACID SCRUBBING AND AMMONIUM SALT RECOVERY SYSTEMS AVAILABLE

A WIDE RANGE OF AUTOMATION AND REMOTE MANAGEMENT OPTIONS AVAILABLE

ISO 9001 REGISTERED FIRM

ENVIRONMENTAL MANAGEMENT SYSTEM ISO 14001

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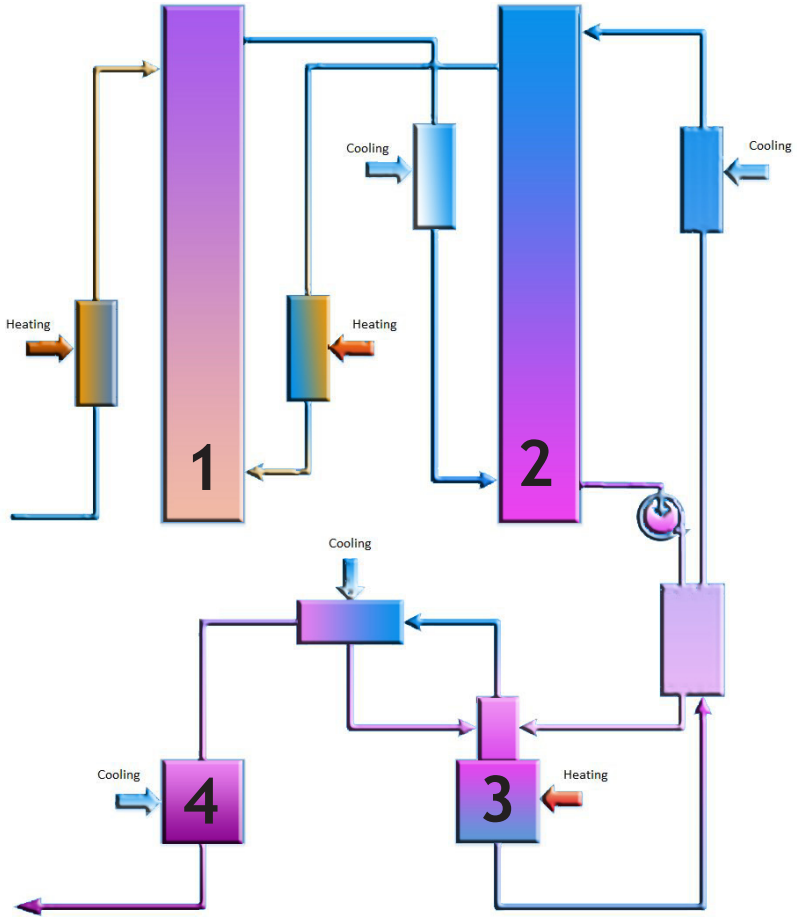

MAIN COMPONENTS

The process involves: (1) a thermal ammonia stripper to break the ammonium ion and drive off ammonia gas; (2) a cold-water scrubber to remove ammonia from stripper air, allowing the air to be re-used and not released; (3) a pressurised evaporator, to drive ammonia gas out of the pressurised carrier water; and (4) a final pressurised condenser to collect anhydrous ammonia. After unit (2), the cold water scrubber, the process may be interurped and ammonia hydroxide withdrawn as a final product.

THEORY IN BRIEF

Ammonia nitrogen is present in water in two forms. The first is as dissociated ammonia, NH_4^+, also referred to as the ammonium ion. The second is as undissociated ammonia, NH_3, known as ammonia gas.

Dissociated ammonia may be converted to undissociated ammonia by the addition of a base, such as sodium hydroxide.

It is a key component of the thermally-driven stripping process that this dissociation is achieved by means of thermal addition without the need to adjust pH.

The equation governing the relationship between ammonia gas and the ammonium ion is as follows:

$NH_4^+ + OH^- = NH_3 + H_2O$

The ratio of ammonia in the gas phase to the total ammoniacal nitrogen, referred to as " f ", may be expressed as follows:

$f = [NH_3] / [NH_3] + [NH_4^+]$

SPECIFICATION DATA

Flow rates available:
50 to 3,000 cubic metres per day

Ammonia concentrations:
Up to a maximum of 6,700 mg/l has been reduced to less than 100 mg/l. However, the process is not limited to these figures.

Chemicals required
Subject to the exact process selected it may be necessary to dose the wastewater with anti-foaming agents

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