



UREA-AMMONIUM NITRATE (UAN)

Typical end products

Fertilizers

Introduction

Ammonium nitrate (AN) and urea are used as feedstocks in the urea-ammonium nitrate (UAN) liquid fertilizers production. Typically, most UAN solutions contain 28, 30 or 32% nitrogen but other customised concentrations (including additional nutrients) are also produced. Most of the large scale UAN production units are integrated into complexes, where either urea, ammonium nitrate or both are produced.

The concentrated UAN solution has higher nitrogen content than the standard urea. Liquid UAN is easy to transport and to distribute through pipelines. UAN solutions are manufactured in normal fertilizer plants.

Application

Urea, ammonium nitrate and water are mixed in the final tank. Typical end product content is 40% ammonium nitrate and 30% urea with water making up the remainder.

Continuous and batch type processes are used. In both processes, concentrated urea and ammonium nitrate solutions are measured, mixed and then cooled. The objective of the mixing process is to achieve the final required value of total nitrogen content (28, 30 or 32%).

In the continuous process, the ingredients of the UAN solution are continuously fed to and mixed in a series of appropriately sized static mixers. Raw material flow, as well as finished product flow, pH and concentration are continuously measured, and adjusted. The finished product is cooled and transferred to a storage tank for distribution.

In the batch process, the raw materials are sequentially fed to a mixing vessel fitted with an agitator. The dissolving of the solid raw material(s) is measured and can be enhanced by recirculation and heat exchange, if required.

Installation

The K-Patents Process Refractometer PR-23-GP is installed to monitor the mixing of the urea and the ammonium nitrate.

A second installation point is for the finished product during transfer to the end storage tank. The Refractive Index (R.I.) monitors the addition of urea and ammonium nitrate. The R.I. is an essential quality parameter for the finished product concentration. Typical R.I. range is 1,425-1,455 at the temperature of 20°C (68°F).

It is possible to have an output of total nitrogen content of the solution by combining the measurements from the K-Patents refractometer and density device.

Instrumentation	Description
 The image shows a K-Patents Process Refractometer PR-23-GP. It consists of a white rectangular electronic display unit with a small screen showing the number '25.31'. Attached to the front of the unit is a stainless steel probe with a red, cylindrical, threaded section at the end, which is used for clamping onto a pipe or tank.	K-Patents Process Refractometer PR-23-GP is an industrial refractometer for large pipe sizes and tanks, cookers, crystallizers and kettles. Installation through a flange or clamp connection.
Measurement range:	Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 % by weight.