Uhde Fertilizer Technology

Newsletter

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Agrium continuous its Borger plant expansion

In February 2014, the Agrium board approved a debottlenecking project at its Borger plant, which is expected to cost $720 million. Besides an expansion in ammonia and urea synthesis capacity the project comprises a 1,800 mtpd urea granulation plant with UFT technology. Construction began in March 2014 for anticipated start-up in the fourth quarter of 2015.

Dangote Group build Africa's Biggest Fertilizer Plant in Nigeria

Dangote Group of Nigeria will build Africa's biggest fertilizer plant in the country's southern Edo state. The company signed an agreement with Saipem SpA's Nigerian unit to build the plant, which will include two trains, each with the capacity for 3,850 metric tons per day of granulated urea. Uhde Fertilizer Technology will provide the technology as well as the license for both fluid bed granulation plants. Aliko Dangote, president of the Dangote Group announced that the plant will make Nigeria "self-sufficient in fertilizer production and even have the capacity to export".

Third UFT granulation in Turkmenistan

Mitsubishi Corporation (MC) and GAP Instaat Yatirim ve Dis Ticaret A.S. (GAP) have reached an agreement with the government of Turkmenistan for the construction of a large-scale fertilizer plant in Turkmenistan. The plant, to be constructed in Garabogaz, northwest of the country along the Caspian Sea, will be the largest urea fertilizer plant in the country, with contracts amounting to some 1.3 billion US dollars. The urea plant will have a production capacity of 3,500 ton per day. Uhde Fertilizer Technology will provide the technology as well as the license for the fluid bed granulation plant.

Borealis selected UFT granulation and Ammonia Convert Technology

The international company plans to expand the production of its site in Granpuits, France. Borealis selected the UFT granulation including our proprietary Ammonia Convert Technology for a capacity of about 850 MTPD.

Horizontal scrubbing system from Kimre only available with UFT

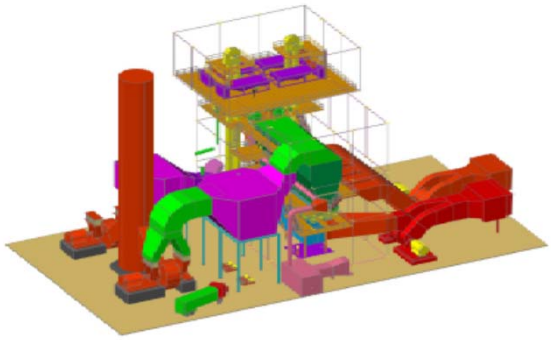

Figure 1: Layout of a typical UFT-Granulation plant with 3,600 mtpd capacity

With the continuous development of technology and increased public awareness the emission limits required by the regulatory authorities or recommended by leading institutions have been continually reduced.

Typical modern emission limit requirements :

- reduced visible stack emissions (opacity)
- Urea dust << 10 mg/Nm³
- Ammonia < 20 mg/Nm³

The reduction of the permissible values primarily focuses on new plants and can be taken into account during the design. However older plants are also often required to achieve much lower emission figures then was foreseen during their original design, e.g. when the plant is modernized or debottlenecked. This poses additional challenges as the limitations of the existing facilities and the available space at site must be taken into account.

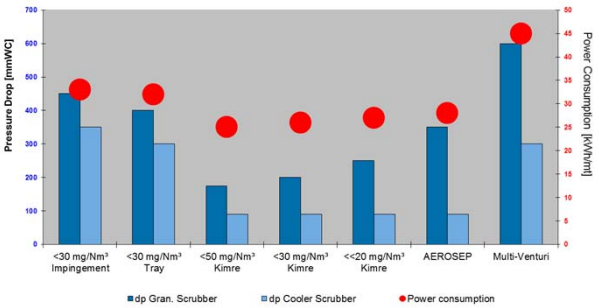

Figure 2– Comparison of different scrubbing systems

Figure 2 shows the pressure drops and power requirements of a typical horizontal scrubbing system (e.g. using Kimre technology) for the different scenarios given by the assumed emission limits. As can be seen the differences according to the requirements are remarkable and a tailor made design is highly recommended in order to optimize investment and operating cost.
This scrubbing system was jointly developed by Kimre Inc., USA and UFT. In this system the dust laden gas flows horizontally through the scrubber. It is initially contacted by a set of pre-conditioning sprays which saturate the gas and reduce the coarse particle loading of the inlet gas stream - the quench stage. Then, the gas makes contact with a sequence of wet pads.
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A horizontal cross flow scrubber (Fig.: 3) consists of

- Quench stage
- One to two dust stages (depending on the emission limits)
- Acidic NH_3 removal stage (optional)
- Final Demister
- For further reduction of visibility (opacity) an additional aerosol removal stage (Aerosep®) will be applied

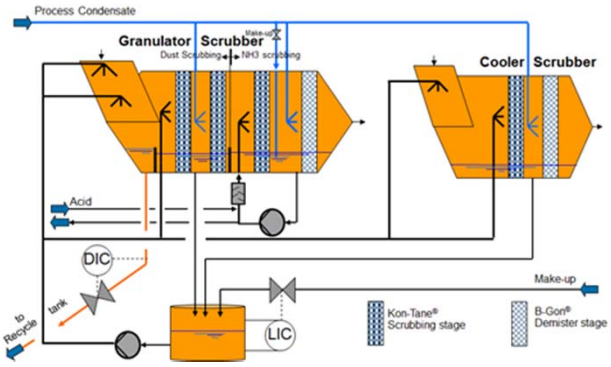

Figure 3: Schematic of Horizontal cross-flow scrubbing system as used in UFT plants

The dust collection pads must be irrigated to prevent clogging and drying out. For spraying the pads in the first dust removal stage a dilute urea solution can be used. Ideally this is the bleed from the cooler scrubber. This urea solution is also used for the quench stage. For the second dust removal stage clean process condensate should be used. The bleed from the second dust stage is used as make-up for the first stage. The spray nozzles are of a low pressure drop design (< 5 bar). The number of nozzles and the total irrigation flow to the pads is determined by the cross sectional area of the pads, which in turn is determined by the air flow.

If required an acidic stage for the removal of NH_3 can be added downstream of the dust scrubbing section. This section has a separate liquid circuit for the acidic solution and the scrubber bleed which contains an ammonium salt. The horizontal gas flow through the scrubber ensures that there is no cross contamination of the upstream dust stages with ammonium salts or acids. This must be prevented as the scrubber bleed (a 45% urea solution) from the dust removal stages is returned to the evaporation section of the synthesis unit.

The final stage is a separation stage which consists of a demister to remove droplets before the off-gas is discharged to the stack via the scrubber exhaust fan. The demister must be flushed by clean process condensate. If a NH_3 separation stage is included then the bleed from the separation stage might also contain traces of ammonium salt or acid. In this case it cannot be returned to the scrubbing system but must be discharged in order to avoid entrainment of ammonium salts and/or acid into the urea synthesis section.

The advantages of the innovative horizontal cross-flow scrubbing system for fluid bed urea granulation plants jointly developed by Kimre and UFT are:

- Compliance with most stringent emission limit requirements
- Simple, modular and industrially proven design
- Highest separation efficiency with the lowest operating cost
- Low overall investment cost
- Suitable for small and large plant capacities
- Scalable to changing emission limit requirements (e.g. debottlenecking or revamp)
- Easy to implement for revamp of existing scrubbing system

The scrubber system shown in Figure 3 is for a large plant which requires separate granulator and cooler scrubbers. Smaller plants, particularly those which use a bulk flow product coolers, can be designed with just one scrubber using the same simple process design.

This type of scrubbing system or similar installations is already in operation in more than 9 fertilizer plants and another 5 are being built or engineered.

New UFT-Brochure ready for download

The updated UFT-Brochure is available on our also updated webpage www.uhde-fertilizer-technology.com

Contact us

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www.uhde-fertilizer-technology.com