Purifier™ Ammonia Process

KBR's Purifier™ Ammonia Process has been proven to deliver a clean, dry, make-up gas to the synthesis loop and simple and precise H_2/N_2 ratio control.

COMMERCIAL APPLICATIONS

With KBR's cryogenic Purifier syngas technology, you receive a lower cost, more robust processing route to high purity synthesis gas in ammonia manufacturing plants. The proprietary, front-end process cryogenic purification technology simultaneously removes impurities (i.e. methane, argon) from synthesis gas by washing it with excess nitrogen while adjusting the hydrogen to nitrogen (H_2/N_2) ratio to 3:1.

KBR's Purifier Ammonia Process combines the following proprietary technologies to yield an extremely reliable, robust, low-energy plant:

- Magnetite ammonia synthesis in a horizontal converter
- Mild reforming with excess air
- KBR Purifier

BENEFITS

Low Energy Consumption

- A clean, dry make-up gas reduces the load on the synloop compressor and refrigeration systems, providing operational cost savings
- Mild reforming temperatures are used, which reduces fuel consumption and prolongs tube life
- Higher loop conversion is achieved with low inerts
- Purifier plants operate at some of the lowest proven energy consumption; a recent plant achieved an energy consumption of 6.3 Gcal/MT (ISBL, LHV basis)

PURIFIER™ AMMONIA PROCESS

Flexibility

- Achieves greater stability and flexibility of operation, since the reforming section does not need to be tightly controlled to produce a precise H_2/N_2 ratio
- Maintains production even in the event of catalyst deactivation upstream of the Purifier

Reduced Capital Costs

- No separate purge gas recovery unit is needed because purge gas rejected from the synloop is passed through the Purifier unit
- Very clean make-up gas provided by KBR's Purifier process lowers synthesis pressure, catalyst volume and purge rate, which means that smaller synloop equipment can be used
- 35% smaller Primary Reformer due to use of excess air in Secondary Reformer and mild reforming temperature

Reliability

- Low reforming temperatures translate to lower stress in, and longer life of reformer tubes
- Low waste heat boiler inlet temperature results in high reliability
- Numerous Purifier plants have run three to four years without a maintenance shutdown

HORIZONTAL AMMONIA SYNTHESIS CONVERTER

For conventional magnetite ammonia synthesis loops, KBR offers its horizontal ammonia synthesis converter. The converter contains two or three reaction stages, each with vertical downward flow in the magnetite catalyst beds. Intercoolers are provided between the catalyst beds for maximum conversion and heat recovery.

The catalyst basket is easily removed from the converter shell for catalyst loading and unloading. The basket can be rolled out of the horizontal converter vessels on tracks, thus avoiding the need for scheduling and erecting a heavy and expensive crane for periodic maintenance.

COMPREHENSIVE SOLUTIONS TAILORED TO YOUR OBJECTIVES

Partner with KBR to optimize your efficiency and capitalize on market opportunities. A leading ammonia licensor and innovator since 1943, we have licensed more than 250 ammonia plants. We have completed more than 200 revamp studies and 100 ammonia revamp projects, including over 30 process revamps and 48 furnace revamps between 1990 and today.

kbr.com

Follow us on social media:

Contact us for more information:
technology@kbr.com