York technology powers **Omnia innovation**

Omnia's new R670-million nitro-phosphate (NP) plant in Sasolburg, which has recently come online, is built around an innovative and highly efficient new production method that is going to be a game-changer for the company. Johnson Controls' Sabroe compressors, which power a custom-build ammonia chiller plant, play an important role in achieving this.

Russell Hattingh.

Kripal Daby.

"A core part of Omnia's new nitro-phosphate (NP) production innovation is a more efficient method of crystallisation, which requires the NP liquid to be rapidly cooled," explains Kripal Daby, lead process engineer for the project. "As this is a critical part of the process, we needed a chiller solution that was not only robust and reliable, but capable of managing variable loads, and able to respond effectively and operate cost effectively.

"The custom-built Johnson Controls ammonia chiller was not only able to meet our functional demands, it was also able to offer us high energy-efficiency gains, helping to ensure our new production method is viable and sustainable," adds Daby.

Finding the ideal configuration took collaboration. "Johnson Controls worked closely with the Omnia team through multiple testing phases to engineer and configure the chiller solution for the new NP plant," says Russell Hattingh, engineering manager at Johnson Controls. "We are pleased to be part of what we believe is an important innovation in the sector."

The standard NP production method is well known. It comprises dissolution of rock phosphate with nitric acid, crystallisation of the dissolving solution and separation of the crystals from the acid solution. Approximately 40% of the new Omnia NP plant process is known – up to the making of the NP liquid. The crystallisation process is where the differentiation lies.

Says Hattingh: "Omnia required different temperature brine streams. To make the process viable, efficient operation of the chiller is critical, so multiple evaporating temperatures had to be provided for.

"We settled on the use of four SABROE screw compressor chillers operating in parallel. All these units have variable speed drives, which enable the chillers to operate reliably over a wide range of conditions, while cutting energy use significantly. A larger swing compressor was added for versatility and redundancy.

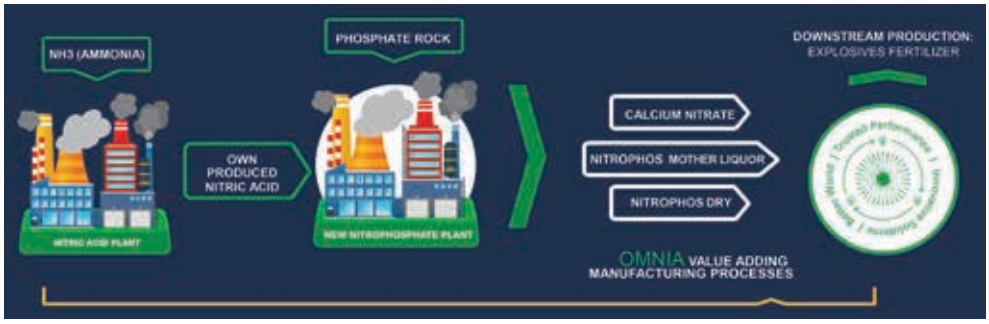
"Given the criticality of the solution, the service capability that Johnson Controls can provide was an important factor in winning this deal," Hattingh says.

The saving for Omnia is significant. "The chillers are able to run at high capacity (90%) and still lower our energy usage, delivering up to R900 000 in energy savings per annum," says Daby.

In phase two, Omnia will double the capacity of its NP plant, expanding the chiller solution to seven Sabroe compressors.

Notes Hattingh: "We will continue to work with Omnia to ensure optimal performance of the Johnson Controls ammonia chiller plant and to customise and refine outputs to meet the requirements of the NP plant as it ramps up production.

"This is a unique application for an exciting new operation and we are pleased to have been able to meet Omnia's requirements. It's a great reflection of what becomes possible when we collaborate with our customers, combining deep industry knowhow and advanced engineering," he concludes. ❑



Omnia's new R670-million nitro-phosphate (NP) plant in Sasolburg is built around an innovative and highly efficient new production method fed by a custom-built ammonia chiller plant powered by Johnson Controls' Sabroe screw compressors.

The new Omnia nitrophosphate plant requires different temperature brine streams. The custom-built Johnson Controls ammonia chiller was not only able to meet functional demands, it was able to offer high energy-efficiency gains.