

## **PI IN DEPTH SCAN PQ EUROPE WINSCHOTEN NL**

### **A. Description of process in general terms**

The PQ beer silica plant has been founded in 1916 by Jan Albert Koning, a Dutch pharmacist, under the name of GEMBO: “Gemeenschappelijke Energie Maakt Bloeiende Onderneming”. Today, the Winschoten factory still produces waterglass and beer silica. Beer silica is used in the backend of beer manufacturing processes to produce a transparent beer quality. It is made from waterglass and hydrochloric acid.

### **B. Objective of In Depth study**

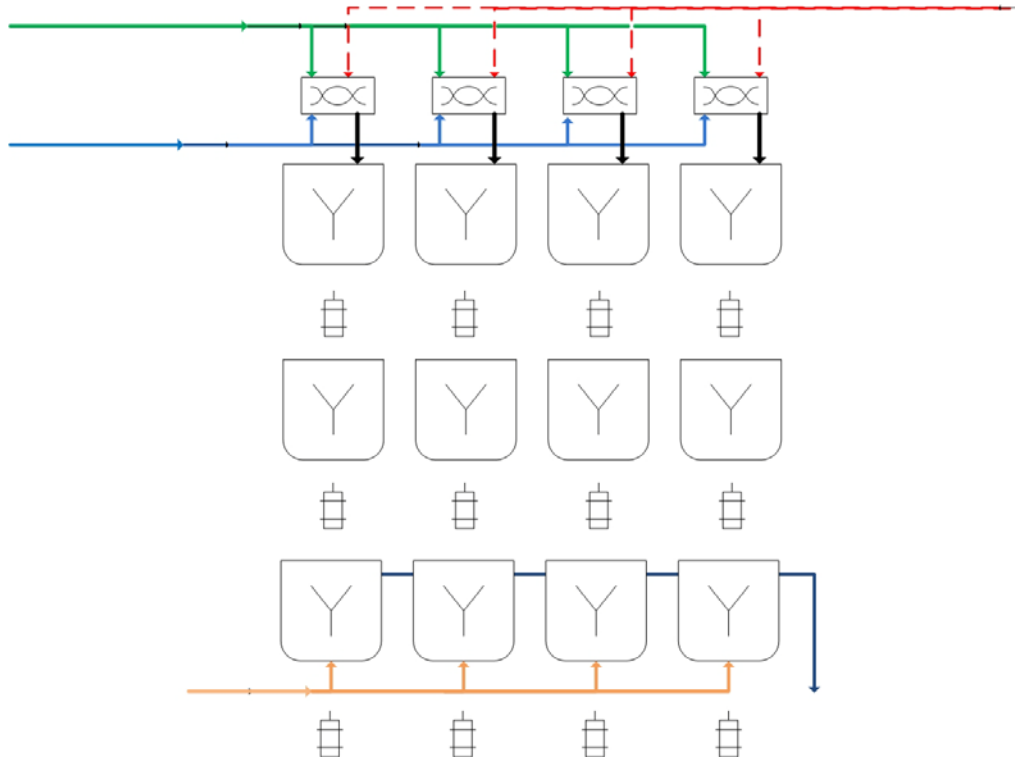
The beer silica manufacturing process has been screened for short, medium and long term possibilities for Process Intensification in the period December 2010 - May 2011 by a team of PI-experts (Traxxys and Process Plant Design) supported by Agentschap NL. Capacity increase has been the main target for PQ.

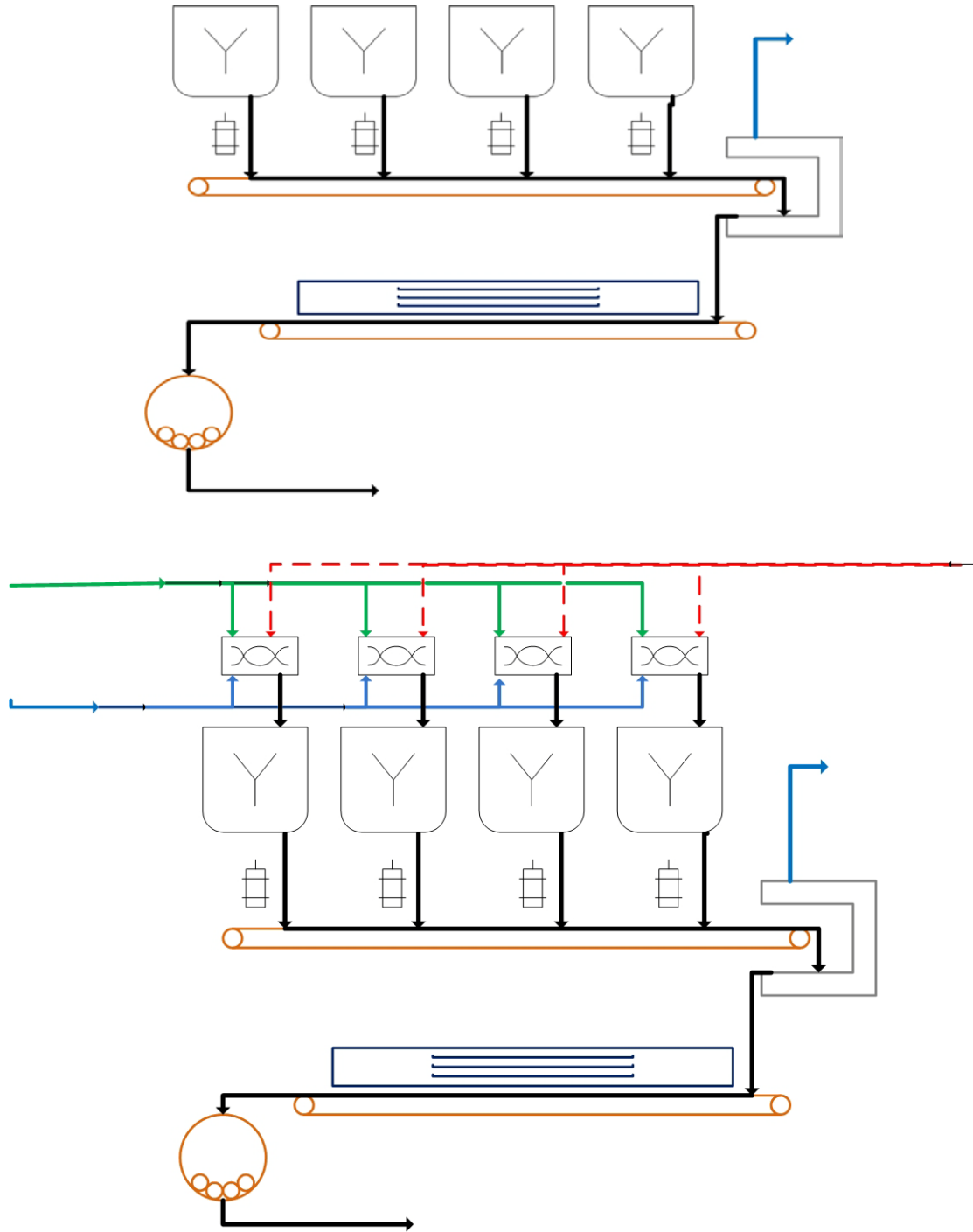
### **C. Method**

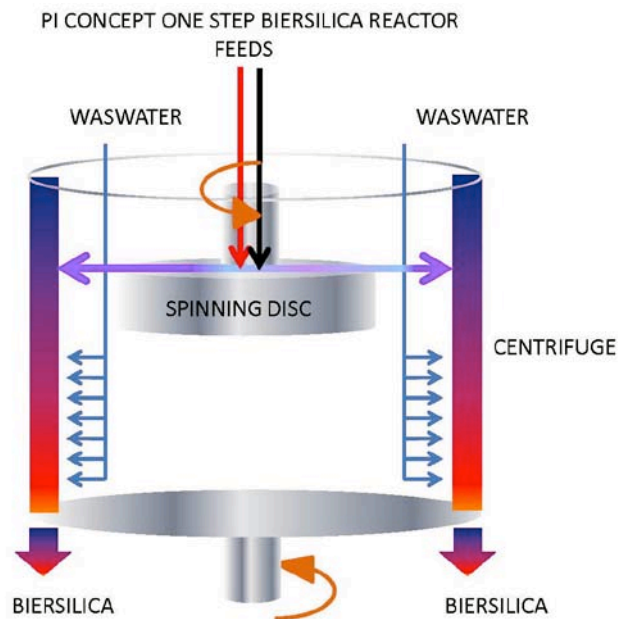
During a Process Opportunity Analysis session the scope of the study has been determined and all process bottlenecks have been identified by a joined PI team. This team consisted of four PQ representatives with relevant skills and process knowledge and two external PI experts. This session was followed by the Process Intensification module, which consisted of a Diverging and a Converging module. These modules form the heart of the innovation process that PI brings about. Active participation of the PQ team members has led to a Long list of PI options that could be integrated in the process. In order to make a selection out of these options, the PQ members of the team formulated company criteria for selection. Finally this led to several PI-alternatives and one Business Case. These have been detailed by the PI experts. Final findings have been reported tot PQ Management in a wrap up Management reporting Meeting.

D. Results

The following Process Flow Diagrams have been presented to PQ.







The PI-specific technologies in these proposals are all commercially available, except the last concept. They focus on:

- Enhanced mass transfer
- Controlled combined feedstock mixing and reacting
- Controlled particle growth during reaction
- Hydrodynamics and mass transfer of the washing cycle

Capacity increase can be accomplished by a combination of intensified redesign of the process front end (medium term) as well as improved hydrodynamics of the washing cycle in the process back end (short term).

Improvements in energy efficiency in the short term comprise of significant reduction of steam consumption in the process backend due to the intensified washing and the cycle time shortening of the washing step.

The Business Case of the short term proposal shows a payout time of 1 – 1,7 years.

#### E. New insights for the company

PQ has a thorough knowledge of the beer silica manufacturing process in its current state. Nevertheless the active participation of PQ in the Process Intensification In Depth study resulted in a Longlist of PI process opportunities.

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F. In company follow up

PQ started already a project team to implement the results of the PI scan. After realizing these modifications, the results of the In Depth study will be implemented.

G. External communication about the study

PQ has already been active in presenting some of the PI In Depth findings on the “Groen 2012” event in Leeuwarden (February 23<sup>rd</sup> 2012). The presentation resulted in a lively discussion with the audience on the potential of PI In Depth. PQ will also present some of the results at the Spring Session of PINNL on April 19<sup>th</sup> in Utrecht. When asked, PQ will consider presenting PI Scan results on other appropriate occasions.