

TECHNOLOGY HORIZONS

A publication by Zetron, the pilot plant specialists

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AVANTIUM REALIZES DAWN TECHNOLOGY™ PILOT PLANT

This summer Avantium introduced their new biorefinery technology to the market. Dawn Technology™ is an innovative process that converts non-food plant-based feedstock into high purity industrial sugars and lignin. These sugars, such as glucose, are excellent raw materials for chemistry and fermentation processes used to produce a broad range of products. The lignin is dense in energy and ideal for energy generation in addition to other higher value applications.

Avantium developed their new process to the level ready to incorporate into a new

pilot plant. In this early stage Avantium and Zetron jointly worked on developing the basic design. The type of chemicals like strong acids and the nature of the biomass brought a number of technical and process challenges in scaling up from lab scale tests into a successful working industrial pilot plant.

To overcome these challenges, and to de-risk the overall project, a section of the plant was built and tested during the basic design phase at Zetron. This ensured the right selection of hardware solutions in an early phase of the project.

In parallel with these tests a modular concept was developed to design, build and transport a two story pilot plant. The on-time and on-budget delivery of the project showed once again that a good start is half the battle! This new pilot plant is the latest result of the successful cooperation between Avantium and Zetron, and we are proud that Avantium chose to team up with Zetron to realize their new Dawn Technology™ at the pilot scale. ■



GLOBAL OUTLOOK

COMMENTARY ON TODAY'S GLOBAL PILOT PLANT DEVELOPMENT TRENDS



Zeton has designed and fabricated pilot, demonstration, and modular production plants for over thirty years. In that time, we have built plants that are detailed, highly specialized, and have varying requirements—no two have been exactly alike. To deliver quality within the diversity of our field, we have developed

and honed our own unique methodology that allows us to bring exceptional efficiency and distinction to any project we undertake.

Trusting Our Team

Our team works to a robust ISO 9001 quality monitoring and control program, but our internal quality aims higher by channelling our years of skill and expertise by empowering team members to make decisions regarding quality all along the project's journey.

During the design phase, plant components are selected that are appropriate for the scale of the plant. Having history with our suppliers means that we can work together efficiently to quickly find high-performance components that are appropriate for the scale, budget and operating conditions of the plant.

When the design moves into fabrication, supervisors, lead hands, and technicians are consulted on a daily basis and empowered to make decisions related to the quality of the build. This includes how custom components designed to be fit-up in our shop are installed and mounted, how equipment and instrument supports are placed, and how best to position for maintenance accessibility.

Design and Fabrication Facility

We have found that combining design, engineering, and manufacturing in the same location greatly improves the quality of modular plant fabrication. Engineers and designers are present and immediately accessible during fabrication to

deal with issues as they arise. They are there to inspect and monitor the quality of the fabrication, and they can quickly and repeatedly ensure that rigorous and special specifications required for the plant are met.

Zeton's manufacturing facilities have been custom built with sufficient height to enable us to fabricate modular pilot and demonstration plants in the exact same configuration as the plant will be when installed at its final site location. This ensures that all connections and interfaces between modules are fit prior to the plant arriving at the operating site. This important quality control feature provides significant value to our customers by reducing the time to install the plant modules at the site and significantly reducing site construction costs, while eliminating rework associated with making the modules fit together again.

The final step prior to shipping a plant is rigorous factory testing, a key element of Zeton's quality process. Simulating fluids are used to run the plant for a sufficient period to ensure all components are functioning as designed at the minimum and maximum operating conditions. All control system inputs and outputs are checked as well as the operation of all safety interlocks.

Zeton's Quality Commitment

Our quality focus continues when the plant is delivered to the customer's site. We send experienced supervisors to the site who worked directly on the particular plant as it was fabricated in our facility. This comprehensive site support means that any issues that arise during the installation can be dealt with quickly and efficiently.

Zeton's commitment to quality over the past thirty years can be seen in the many customers who return to work on multiple pilot and demonstration plants with us. We believe that a high-quality process begins with a focus on team trust, experience, and empowerment. And it is from this foundation that our customers benefit from working with Zeton for their unique pilot and demonstration plants.

Do you have experiences with this approach that you'd like to share? You can reach me at dbeckman@zeton.com, **David Beckman, CEO, Zeton Inc.**

BIOBTX COMMENCES OPERATION OF A PILOT PLANT FOR PRODUCTION OF SUSTAINABLE PLATFORM CHEMICALS

On September 13, 2018, BioBTX B.V. officially opened their pilot plant for the production of sustainable platform chemicals in Groningen, the Netherlands. BioBTX developed the Integrated Cascading Catalytic Pyrolysis (ICCP) technology for production of aromatic chemical compounds (mostly Benzene, Toluene and Xylene or BTX) using 2nd generation biomass and so-called end-of-life feedstock materials. The production of these widely-used chemicals from renewable sources fits perfectly in initiatives for cost effective CO₂ emission reduction and crude oil decoupling.

The first tests will run with liquid biomass feed, mainly glycerol input. A special design solid feeder module to match the scale of this pilot plant will be used for testing solid biomass or end-of-life materials such as plastics. Including this flexibility in feeding capabilities provides



a very interesting and versatile concept for chemical companies aiming to contribute to the circular economy.

With a joint effort from BioBTX-partner Tebodin in the conceptual design phase, and the smooth transition to Zeton in the detailed engineering phase, the plant was designed, built and tested at Zeton's facility in Enschede. Tebodin's expertise as an engineering company

with fluidized bed modelling expertise matched perfectly with Zeton's extensive modular scale-specific knowhow in pilot plant design and fabrication. Zeton's experience in pyrolysis processes at the pilot plant scale ensured a "get it right the first time" approach, which will bode well for next steps in process development at BioBTX, and possible further scale up to commercial production. ■

TEAM SPIRIT HIGHLIGHTING THE ACCOMPLISHMENTS OF OUR STAFF IN THE DUTCH AND CANADIAN OPERATIONS

ZETON'S STAFF NAVIGATES SAILING WEEKEND IN FRIESLAND

On July 14 and 15, 2018 a group of Zeton personnel visited the renowned sailing waters in Friesland, in the northern part of the Netherlands, for a weekend of wind-blown water sports. A number of so-called poly-valk sailing boats were rented and each boat was equipped with a mix of first-timers and experienced sailors.

Even though the warm, sunny weather made for a pleasurable atmosphere, it is the wind that is the determining factor in a sailing weekend. It turned out to be a relatively calm weekend with a 2 to 3 on the Beaufort scale.

With rather inconsistent wind, it was great to see that all sailboats made it to the agreed-upon meeting points, although different paths were navigated. In that sense it's easy to see the parallels with our day-to-day activities. Whatever the circumstances, our team is always able to use the available resources to achieve their goals. And although sailing was the main purpose, the team spirit and overall fun was the highlight of the weekend!



IN BRIEF

HIGHLIGHTING RECENT AND COMPLETED PROJECTS AND ENGINEERING STUDIES

- A reactor downscaling project
- Various orders for pharma processing modules
- A lab scale distillation system for electronic chemicals separation
- A diluent reduction demonstration plant for heavy oil upgrading
- A custom natural gas injection system
- A steam sterilization system for a fermentation pilot plant
- A catalyst preparation unit
- An engineering study for a modular pharma plant
- An engineering study for a lithium extraction demonstration plant



A sulphur chemistry plant



A catalyst deactivation pilot plant



A pilot plant for specialty chemicals manufacture



A chemical intermediates pilot plant retrofit project



CONTACT US

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