Development of modular and skid mounted plants from laboratory to commercial production

Bench scale units, pilot plants and demonstration facilities for catalyst and process development

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In the last 24 years Zeton has developed itself as an all-round pilot plant specialist, developing and building skid mounted modular plants. All these plants involve process development and new technologies, each at its own phase in the overall development process towards commercial implementation. Zeton range of plants goes from small laboratory scale through pilot and demonstration scale up to small scale production plants.

Modularisation of processes and process steps is a potential route for many applications to enable swift scaling of the lab process to its full commercial production scale. Modular plants are already used in R&D for many years. For the plants at this scale, modular is many times used in the same meaning as “skid-mounted”, but should not be confused here.

Translating plants on pilot, demo and production scale into standard replaceable modules has proven to be not straightforward. Because of the range of R&D and productlines, stock inventory of equipment can be enormous for just a small number of operational modes.

However, modularization of process skids already on laboratory scale creates an efficient tool for testing and performing R&D and later translation into commercial applications. It is all about mapping functional requirements, technical and commercial viable solutions in a flexible and easy adjustable way.

Obviously the size of the unit determines to a large extent the investment required and the risk to be taken. Therefore each size has its specific goals and requirements, proofing either the chemistry, the overall process or the production under industrial conditions. Each step must deliver the results to justify the next phase in the project.

Small lab scale plants can permit to use novel designs using beta-version solutions, with the risk to have either new learnings during start-up or unpredicted downtime due to development. On demonstration scale costly process changes have to be avoided. Operation costs are significant and the process lay out has to be pre-defined. At the stage of process demonstration, one must be able to run for long terms. In order to match the engineering and building to the specific project requirements, this requires project size specific project approaches, technical solutions and type of building.

In the presentation, several aspects of the modular and skid mounted building concept will be highlighted, demonstrating challenges and solutions at lab-, demonstration- and production scale.