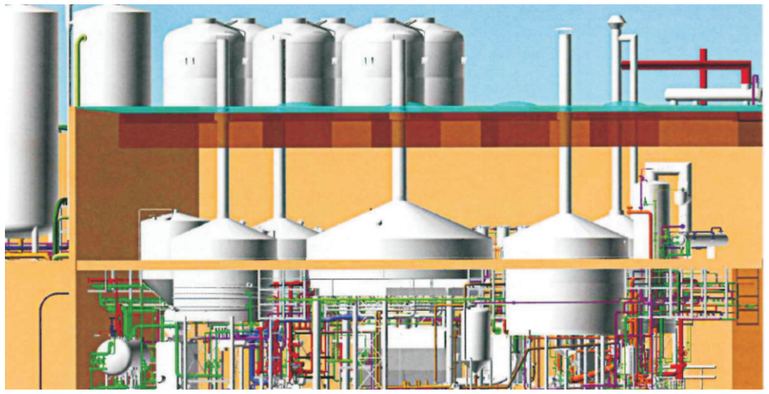
MESSEN, REGELN, AUTOMATISIEREN

# The Integrated Concept

## Integrated Planning of brewing plants with modular CADISON standards



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***The Ludwigsburg-based Ziemann International GmbH, part of the CIMC Enric Holdings Limited, is a competence center for planning and implementation of turnkey brewery plants or expansions & modernization of existing breweries. Each plant / system from brewhouse to pressure tank cellar is planned individually according to the specific needs and desires of the customer and designed for maximum efficiency.***

Tag numbers are used in a process plant to identify components such as valves, pipes and containers uniquely. Approximately 1000 tag numbers are required even in a medium-sized brewhouse for brewery equipment and measuring points identification. Ziemann uses a hierarchical and modular tagging system that is managed in an Access database.

Therefore an engineering software supporting both hierarchical and modular structures was required. A quick evaluation demonstrated immediately that the hierarchical CADISON database can map the number system effortlessly.

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### Modular Way of Working

Within a brewing line if several systems use the same or similar functions, In order to exploit them fully, a structured database-oriented approach is essential. The standard P&ID (Piping and Instrumentation Diagram) for a hops dosing system for example contains three hops tanks. All equipment on this drawing belong to Area 2 (Brewhouse), the brewing line 1 and the subarea 32 (process stage hops dosing). In the CADISON structure, the third hops tank is a subordinate of the logical plant 32_03, which in turn is part of the parent logical plant 21, and thus given the name 21_32_03BB01.

If the brewery needs a fourth tank, they can make a copy of the corresponding logical plant 32_03 and the graphic with the associated piping, valves and measuring points. Just by doing this, the counter of the logical plant changes from 3 to 4 and the tag numbers of all child objects change accordingly automatically. Objects are assigned to a logical plant, and also to a logical hierarchy of media, pipelines and pipe classes. When you copy for e.g. a dosing concentrate system as described before, you are also able to copy the major pipelines, pipe classes and media. These major objects are changed to new media and pipelines by editing the relevant attributes, to which all the copied equipments are attached as per the hierarchy.

Offers for supply of a brewing line are developed from numerous standard P&IDs and assemblies exactly as per the customer's requirements. Due to the seamlessly integrated modular concept, the 3D pipeline drawings and the customer-specific P&IDs are organized as per design process stages. Each P&ID represents a process view of the brewing control system.

### CADISON-Workflow

With the implementation of CADISON, a proposed project can now be developed in an integrated manner compared to earlier when sales and engineering used their own templates.

- **Project planning & budgeting:** Create a custom project offer from standard P&ID templates; Export data from the CADISON Project-Engineer into an Excel-based calculation tool.
- **Engineering P&ID development:** Continuing the offer project created; technical details; export of equipments / valves / measuring points into an Excel list as a central document for the technical processing; the standard object descriptions are converted into specific manufacturer descriptions according to customer requirements here.
- **Engineering 3D piping planning:** Import of 3D models of buildings, tanks (from Inventor); steel construction of the main pipeline routes in the layout design; creating the 3D pipe drawings for each process section and the main pipeline routes with many 3D layouts; drawing export to Navisworks for visualization and coordination with the customer; export of the piping material into Excel; order lists using summarizing tool; Excel list for each pipeline with all piping components.
- **Assembly department:** Take over of P&IDs, piping plans (3D layouts as A0 plots and PDF files), Navisworks model, pipeline lists for assembly.

The benefits of integration are numerous:

- Sales uses standard P&IDs for offers that are created and maintained by the engineering department. This allows savings in engineering and drafting hours.
- In case of an order, the engineering department receives a project with customer specific selection of the P&IDs based on the latest offer including standard tag numbers and space for detailing. This allows to minimize un-interesting and monotonous work.
- The assembly department and the brewery customers understand & manage themselves thanks to the modular structures in both the P&IDs as well as the Navisworks model.

### Modernization of Egger Brewery

We find the first mention of the private brewery Egger in Austria in 1675 and since then it has been successful in the market. With an annual output of 650,000 hl, the existing facilities reached the capacity limit in 2009. Therefore, the construction of a new ultra-modern five-vessel brewhouse, designed to twelve brews per day, and the renovation & expansion of the cold block was planned. The first fermentation was in end of November 2009 and the storage area was expanded to eight additional cylindroconical tanks. As a result, an annual discharge amount of 850,000 hl was possible. Already in mid-December, the new brewhouse was completed.
The main equipment - consisting of a wet mill, two mash tun kettles, a lauter tun, wort kettle with an internal boiler, as well as a vacuum evaporation system - were perfectly on schedule in the new building and installed. The commissioning took place on 28.04.2010 without a hitch, two days before the originally specified date, and the new system was able to run from the first brew and then replace the old brewhouse immediately.

### Outlook for plant operators

The CADISON databases contain valuable inventory data needed for maintenance purposes or expansion needs that should be made available to plant operators. One possibility is using the Navisworks model to view the drawings and pipeline structures as well as selected information for individual objects like for e.g., a 2-way valve.
In all breweries planned with a tagging system, each tag number has a specific meaning and a corresponding functional text that is used for process description and programming of the brewing control system. International brewing enterprises can leverage the CADISON P&ID databases based on logical systems & object classes for e.g. for maintenance and centralized procurement activities for interesting comparisons across different breweries or other brewing lines within a brewery.

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**NOTE**: *This is an English version of brewery plant case study published in 'VERFAHRENSTECHNIK' magazine (Issue: 9/2013)*