



СТАРТ ИНЖЕНЕРИНГ АД

3 Lokomotiv str., 1220 Sofia, Bulgaria

Tel: (+359 2) 931 0784, (+359 2) 936 0373

Fax: (+359 2) 931 0768

E-mail: stensof@abv.bg sofia@starteng.com

URL: <http://www.starteng.com>

Employer	CARLSBERG Bulgaria JSCo
Site	"Pirinsko pivo" Blagoevgrad
Project	Control and monitoring system for: biotechnological process in 10 fermentation/ageing tanks CCT, 4 yeast tanks, 6 conditioning tanks BBT; technological cleaning process (CIP) by 2 equipments – with 6 vessels and with 4 vessels
Activities	Additional design implementation, commissioning and staff training
Execution	October 2005 – February 2006

Brief info about the project:

The project was implemented by the specialists of START ENGINEERING JSCo – Branch Sofia.

The system comprises:

- 2 Operators stations COMPAQ – server-client interface communication. The server interacts with the PLC over SINEC H1 protocol.
- The controller (PLC) is of the type SIEMENS SIMATIC S5-115U, on the base of the CPU 945, a communication module for SINEC H1 (industrial Ethernet) and a communication module IM318 for the SINEC L2 DP communication
- 22 distributed I/O system of the type SIEMENS SIMATIC ET200 with communication modules integrated IM308 in charge for the communication with the PLC over SINEC L2 DP.
- Field instrumentation for measuring conductivity, temperature, flow and pressure; level switches and flow switches by ENDRESS+HAUSER, about 160 proximity switches by Schneider; about 250 pneumatic cut-off valves, 16 pneumatic control valve by SAMSON, 10 variable frequency devices by DANFOSS for el.motors speed control.

The system implements the execution of the technological procedures, which in briefly are:

From the brew installation ("Brew House") the batch of worth is transferred in one of the 10 vessels - **CCT (Cylinder Cone Tank)**, each one of which with the storage capacity of 2500 hectoliters, and right after yeast is added from any of the three **Yeast tanks**. After that in the different zones of the CCTs are maintained definite temperatures for a certain amount of time within the bounds of two phases – fermentation and aging.

The thus produced "live" beer is non-persistent, and therefore the beer is put to a filtration and later on is transferred to one of the 6 vessels of **BBT (Bright Beer Tank - 4 with the storage capacity of 840 hl and 2 – with 1200 hl)** for tranquillization and saturation with the default amount of carbon dioxide. Subsequently maintaining constant pressure the beer is transferred to the filling plant over one of the three filling lines: RGB (intended for glass bottles), PET (for polyethylene bottles) and KEG (for kegs).

Since there are biological products, which take huge place in the production, essential matter for the genuine quality of the beer is the cleaning procedure via the CIP installation, where **CIP** stands for **Cleaning In Place**, and which consists of three subsequent phases:

- 1) Preliminary rinse with water
- 2) The thorough cleaning with caustic or acid, or hot water (or disinfectant)
- 3) Post-held rinse with water.

There are two **CIP** installations on site:

- 1) Designed for cleaning all the vessels and pipes before filtration (**CCT, Yeast tanks**)
- 2) Designed for cleaning the whole equipment after filtration (**BBT, filling lines**)

The first one comprises 6 vessels: 1) for hot water, 2) for cold water, 3) for hot caustic, 4) for cold caustic, 5) for acid and for 6) disinfectant. Here is completely available and admissible the simultaneous operation of, for example, CCT cold cleaning procedure and hot cleaning procedure on pipes, for saving time.

The second **CIP** installation comprises 4 vessels: 1) for acid, 2) for hot caustic, 3) for cold caustic or disinfectant and 4) for circulating water or hot water. Here the simultaneous operation (hot and cold cleaning) is not possible.

The **CIP** procedures keep a strict close control on the temperature, concentration (by conductivity) and time for transition of the chemical agents. Besides they offer the technologists various recipes for performing different cleanings, as well as allow them to change the very recipes.

The **CIP** sequences comprise interlocks for failed conditions, and in addition the inform the operators what the particular cause is and what steps should take.

The above said for recipes, interlocks, messages ... refers not only to **CIP** programs, but also to the biotechnological programs.

CARLSBERG Bulgaria JSCo - "Pirinsko pivo" Blagoevgrad
CONTROL SYSTEM CONFIGURATION

