

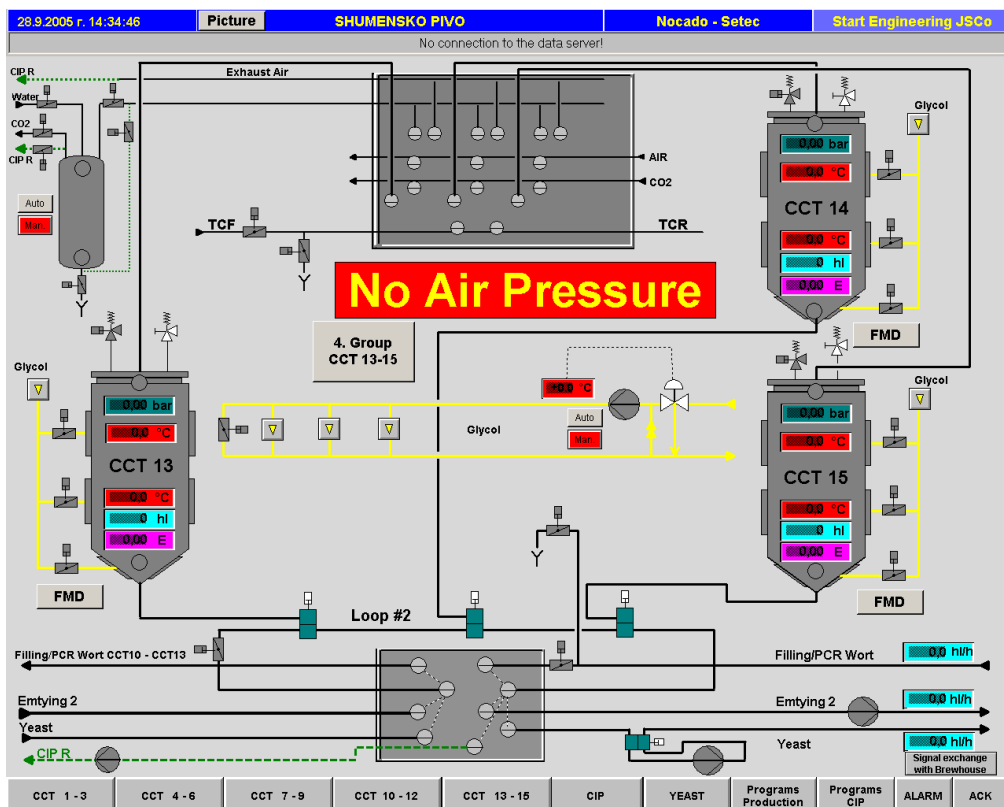
Employer	ALFA LAVAL - Belgium
Site	„Shumensko Pivo” → “Carlsberg Bulgaria” JSC – Shumen
Sub-site	Beer production
Project	I. Extension of the systems for visualization and control in Fermentation department for 6 pcs. of new CCTs II. Systems for visualization and control of new settling vessels – 4 pcs of BBTs and new system for CIP cleaning
Kinds of activities	Design; specifying, order and delivery of part of the equipment; programming; installation and commissioning; training of the personnel
Execution	May - August 2005

The design has been executed by specialists of START ENGINEERING JSC – branch Sofia with the assistance of branch Varna during the installation and participation of leading and executive personnel from the plant during the adjustment

The team of START ENGINEERING JSC especially thanks Mr. Per Persson, who lead the starting up and commissioning works. They would hardly be finished successfully and within the specified deadline without his advices and patience.

I. Extension of Fermentation department with 6 pcs of new CCTs (Cylinder Cone Tanks):

New islands SIMATIC ET200M were installed for their control – distributed periphery of SIEMENS (remote inputs and outputs), CPV electropneumatic islands of FESTO and 2 pcs of frequency convertors of ABB. The above mentioned devices were connected to the existing PROFIBUS DP network. The control software was enhanced, but replacement of the existing CPU 316-2 DP with CPU 317-2 DP became necessary, due to insufficient memory for the new programs. The software for visualization of WinCC (also of SIEMENS) of the six CCT on 19” color monitor was also enhanced. The primery software is made by Nocado - Setec.



Screen CCT 13 -15

II. Extension of the beer production with new settling tanks – 4 pcs **BBT (Bright Beer Tanks)** and new **CIP (Cleaning In Place)** system for cleaning, including 4 vessels for cleaning solvents: hot lye, acid, hot water and fresh water; three vessels for chemical agents (lye, additive, acid); steam heater for water and lye.

A new microprocessor system based on PLC SIMATIC S7 300 of SIEMENS was installed for that purpose: CPU 316-2DP, input/output modules and distributed periphery PROFIBUS DP, including 4 frequency convertors of ABB for regulating the el. motors revolutions and 4 electropneumatic islands CPV of FESTO for control of 60 pcs of pneumatic valves*.

The programs contain a total of 20 pcs of strict process sequences of different number of steps (from 4 to 38), linked by process time or parameter (concentration, temperature, flown quantity); meanwhile, they allow a simultaneous (parallel) execution of several procedures – with different vessels, of course.

* The automation would have been more adequate, if all pneumatic valves had Proximity Switches (not only those in CIP). The same also applies to the manual valves on the panels for switching of lines.

The cleaning solvents are prepared in the relevant tanks with sufficient level, concentration (for acid 20 mS, for lye 80 mS) and temperature of 80°C (for lye and hot water) with the **STANDBY** program. The boiling stone development in the hot tanks shall be cleaned by means of the **INTERNAL CIP** program.

The washing itself is executed by means of two programs – **LINES CLEANING** and **BBT CLEANING**, accordingly for both groups of facilities – pipelines and beer tanks. Each cleaning procedure consists of the following basic phases:

- initial cleaning with fresh water
- circulation of hot base, acid or hot water
- final cleaning with fresh water

The BBT system performs the following basic functions and procedures:

- maintaining of constant pressure of CO₂ (0,5bar) in BBT for achieving of optimal carbonation
- filling of BBT with beer from filtration department
- refiltration (if necessary) of beer from a certain BBT
- releasing of CO₂ from a certain BBT and replacing it with air before cleaning with base
- supplying of beer from BBT to Filling area through one of the three lines:
 - for filling of glass bottles
 - for filling of metal kegs
 - for filling of PETs



CCTs (back) & BBTs (front)



CIP



Mounting



El.pneum. ilands

The operator's panel for control and visualization OP170B is with monochrome screen 320×240 pixels and 4 hues of its color. Due to the small dimensions (11 by 8 cm) of the screen, the process image is split into 34 small mimic diagrams. A 768 KB Flash-EEPROM memory is available to the user's programs.