



# The next generation of manufacturing excellence in API – creating a hybrid facility

## At a Glance

**Company:** API Nutraceutical

**Location:** Pune, India.

### Project Mission

To build a fully automated greenfield factory of the future API nutraceutical production facility that could run as a hybrid of either batch or continuous manufacturing. Delivering; reduced production time and capital costs, improved cycle times and reduced energy costs.

### Product / Services Delivered

- Consultancy services
- DCS: Rockwell Plant PAX
- Instruments: E&H and Vega
- Valves: GEA and Burkert

### Challenges

- Critical process operations with fine controls along with instrumentation
- This was the first time the client had implemented a fully automated facility
- FDA compliance requirements
- Complete manufacturing area: hazardous classification Zone 2

## Introduction

The main goal for this customer was to build a greenfield, API nutraceutical production facility to the highest standards and with a 'factory of the future' design. The facility was intended to be built and qualified to meet FDA regulatory requirements, as well as the local statutory authorities.

The production facility is classed as a hazardous environment, with Zone-2 area classification. During production, the nutraceutical product is highly viscous along with solvent addition (like MDC) and the final product produced is in the form of granules.

This project aimed to build a facility flexible enough to use a mixture of batch and continuous production technologies. To achieve this the software engineering design had to be done in a modular approach to support batch and continuous operations. It would also be the first production facility intended to operate in a fully automatic mode - prior to this all of the client's facilities operated manually.

This new 'Factory of the Future' was designed to reduce production time, reduce capital costs, improve cycle times and reduce energy consumption.

### Client Challenges

Implementing a complex facility of this nature brings with it many challenges. This was the first fully automated factory for the client, with ambitious expectations and goals. The client needed help with Instrumentation, Valve and DCS selection and there were high initial cost, combined with long lead delivery times.

This facility had chosen specialised, wide-ranging equipment, alongside stringent control strategies. It also included integration of third-party equipment from different automation manufacturers. The project equipment consisted of reactor vessel, emulsification, ATFE, holding vessel, spray congealing vessel, silo vessels, vacuum system, and operation through the DCS. As well as third party systems including: Ethernet CIP, PTS and over Modbus FBD, PUW, De humidifier, Chiller, and ABB ACS 560 series VFD.

This project needed to have flexibility built in from design and be adaptable to sustain a mixture of batch and continuous processes. This meant the potential for complex equipment designs and controls which required robust operations.

## Our Solution

Zenith Technologies, a Cognizant Company worked as part of the engineering consultancy team to deliver turnkey project execution for the automation and instrumentation, from conceptual engineering for instrumentation and automation for development. We were the largest engineering team during the design, construction and testing phases.

As the main systems integrator we designed and implemented Rockwell Automation's PlantPAx DCS as the main automation platform for this project. We deployed state of the art engineering practices, whilst meeting global standards such as: ISA S88 for recipe management.

We ensured the modularity of the programming was maintained, whilst utilising the latest technologies in support a hybrid approach of both batch and continuous manufacturing.

The graphics were developed with consideration to operator effectiveness as per ISA 101. We integrated AC drives & some other devices on Modbus communications, automated process operation and CIP of all the equipment. We selected the best instruments and valves suitable for the process and area classification (intrinsically safe) whilst complying to all hygiene factors required for food grade applications.

The software engineering included FAT, SFAT, installation and commissioning of the control system and computer system validation.

## Results and Benefits

Working in close collaboration with Zenith, the company successfully opened the new facility and was able to achieve higher levels of productivity, agility and flexibility. The hybrid nature of this facility means the production cycle times are reduced, and there is high equipment occupancy. It also minimises time between two different production campaigns.

Project delivery highlights:

- One stop solution with one-point responsibility from consultancy to the commissioning of the fully automated plant
- Ease of operation and monitoring from a central location
- Data logging at centralised location
- Online diagnosis for corrective actions and maintenance
- Flexibility to use either batch or continuous manufacturing
- Overall process cycle time reductions
- Equipment occupancy and availability of next batch
- Non exposure of the hazardous area to operator w.r.t. human safety
- Non contamination prevention to increase productivity and quality improvements
- Project was completed on time and to budget

## At a Glance

### Solution

- Largest engineering team during design, construction and testing
- Technology selection and implementation
- Delivery of automation to support a hybrid approach of batch and continuous processes
- Integration of data collection systems for process measurement, alarming and reporting
- System commissioning & validation

### Results

- Higher level of productivity, agility and flexibility
- Easy of troubleshooting and maintenance
- Manpower optimization and effective utilization for plant operation
- Flexibility to use either batch or continuous manufacturing