

Pidilite Industries Limited Ltd.

ADHESIVE PLANT is automated to achieve high quality product with optimum batch-time.



PROJECT AT A GLANCE

Project Type

Adhesive

Location

Vapi

Application

Adhesive Plant

System Components

- Modicon M580 Processor
- Ethernet Network
- Vijeo Citect SCADA 500 tags
- Unity Pro

CUSTOMER BENEFITS

- Flexible Manufacturing
- High and consistent product quality
- Easy diagnostics
- Solvent Batching
- Batch Process Management



Since its inception in 1959, Pidilite Industries Limited has been a pioneer in consumer and specialities chemicals in India. Over two-third of the company's sales come from products and segments it has pioneered in India.

Pidilite product range includes Adhesives and Sealants, Construction and Paint Chemicals, Automotive Chemicals, Art Materials, Industrial Adhesives, Industrial and Textile Resins and Organic Pigments and Preparations. Most of the products have been developed through strong in-house R&D.

The Group's turnover is 4103 Crores for the year 2013-14 to the 2015-2016 and 6,048.18 Crores is the current turnover for the year of 2018-2019.

Pidilite Industries is the market leader in adhesives and sealants, construction chemicals, hobby colours and polymer emulsions in India. Their brand name Fevicol has become synonymous with adhesives to millions in

Make the most of your energy

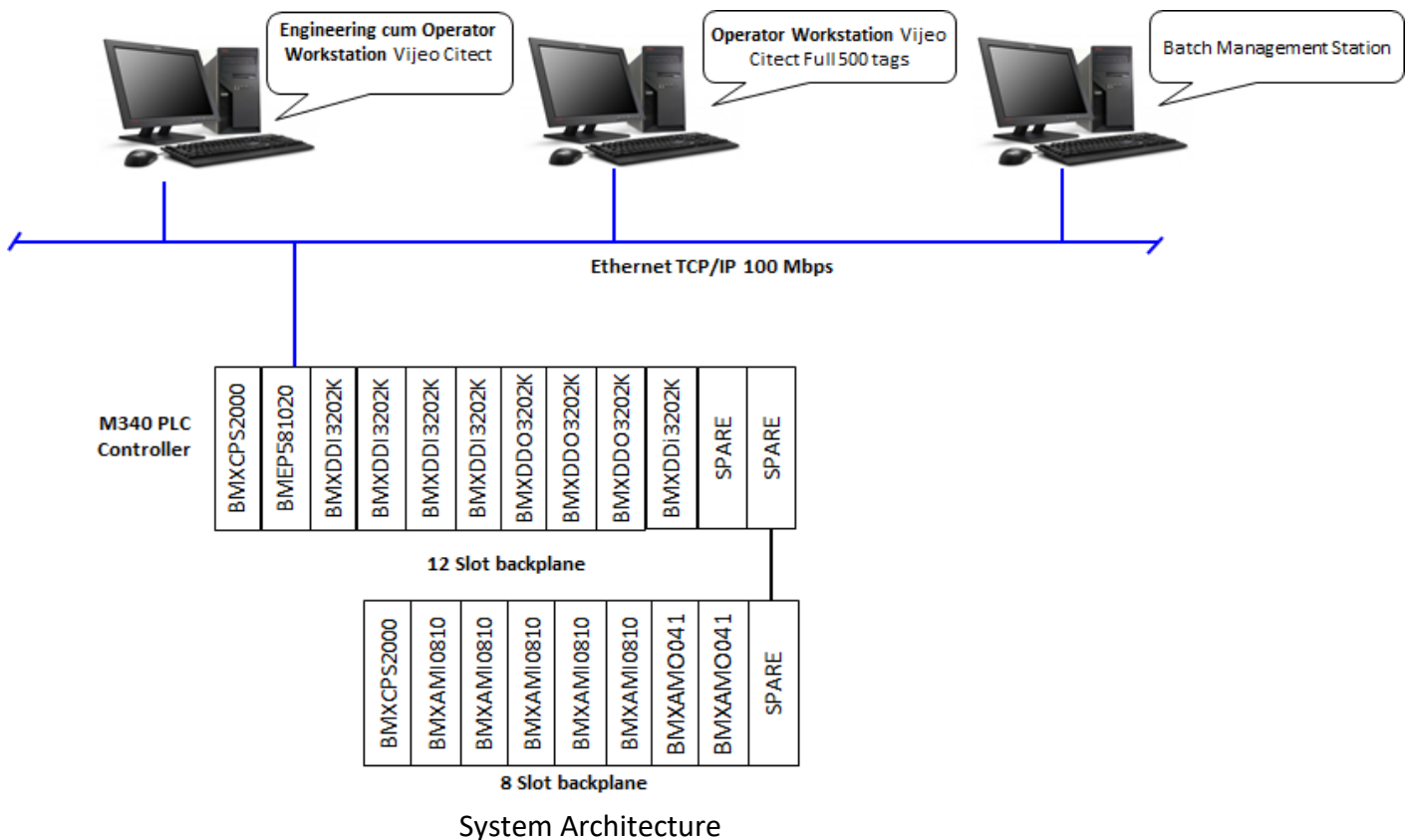
The Challenge

Process Control and Data Acquisition in a Specialty Chemicals plant. Main requirements were:

1. Accurate Raw Material Charging in the Reactor
2. Reactor Temperature Control
3. Monitoring of Utilities Parameters
4. Batch Process Control as per ISA S88 standard

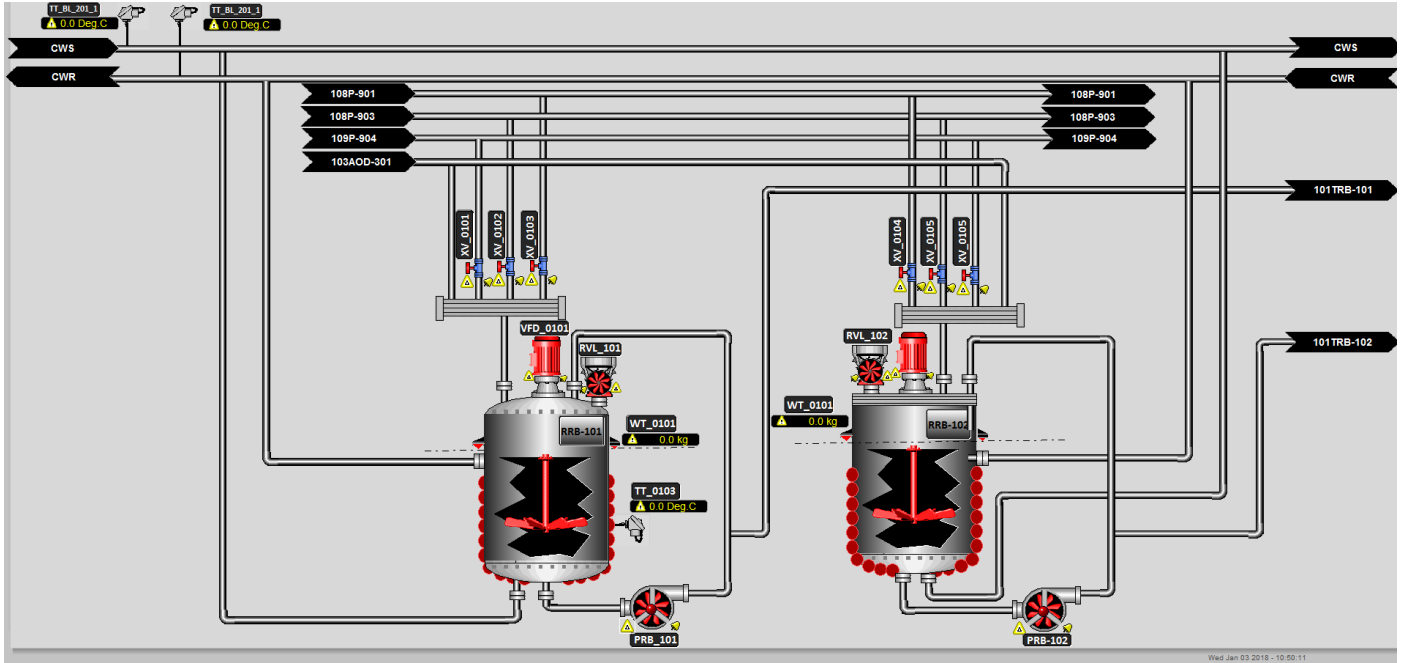
The Solution

The system Configuration for the control system is shown in below figure. It consists of PLCs, Operator Stations, SCADA, Ethernet Communication Station & Batch Management Station.



1. Accurate charging of raw materials was achieved by batching tank on load cell based weighing system and auto material charging function block.
2. Reactor temperature control was achieved using standard PID block.
3. Monitoring of utilities such steam and cooling water was done in SCADA
4. Batch Control as per ISA S88 standard was achieved using SUPERBatch Batch Management System. It provides recipe based batch operation and several batch reports.

5. Following are the main Process Reactors RRB-101 and RRB-102.



The Benefits

Increased data availability for improved decision making

Data about the raw material and energy consumption is available in the system. Batch Management system provides batch wise process data that helps in management decision making.

Open architecture increases ROI

The system is based on open architecture based on Ethernet. All I/O are accessible from a central location. It makes the system user friendly and easy to maintain.

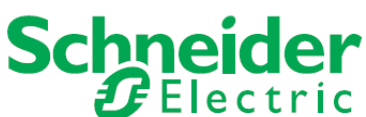
High system availability for improved productivity

The high system availability offered by PlantStruxure architecture through its reliable Ethernet network and redundant topology options allows for continuous plant operation, avoiding unexpected stoppages that can reduce plant productivity and potentially cause loss of assets and product used in the process.

Batch Process Management as Per ISA S88 Standard

The system provides user friendly recipe based operation and various batch and management information reports. The system is ready for integration with ERP.

Make the most of your energy



*This system was designed and supplied by Supertech – Master Alliance Partner of Schneider Electric:
Supertech Instrumentation Services (I) Pvt. Ltd.*

Success Story

Polychem Resins, Dubai(UAE)



Customer environment & needs

Customers profile: Polychem Resins International Ind. LLC, Dubai – U.A.E., is one of the leading resin manufacturers in U.A.E. . Its range of products includes medium oil, long oil, short oil alkyd and various grades of unsaturated polyester resins.

Process of manufacturing of resins is a typical batch process, which calls for charging of specific materials in required quantity, precisely controlled heating/cooling cycle and maintaining the right temperature during the exothermic reaction.

Though resins are manufactured based on a predetermined recipe, the product quality and the consistency in product quality depends upon the skill and proficiency of the operator in controlling the entire batch process. A slight variation in quantity of the materials used/in temperature profile/in vacuum control may result in appreciable change in product quality as well as in batch-time.

Customer Objectives And Constraints: The main objective behind the automation of the Alkyl and Unsaturated Resin Plant, consisting of 2 nos. 15T Resin Reactors, 2 nos. 30T Blenders, packed column, Vertical/Horizontal Condenser and Vacuum System, using PLC/SCADA System, was to not only improve the product quality and the consistency in the product quality, but also to reduce the batch-time, wherever possible, at an optimum cost.

Keeping in mind the significance of all these processes, Supertech offered a PLC/SCADA based complete turn-key automation solution, right from design, integration, software development to supply of various equipment such as sensors, transmitters, control valves and variable frequency drives. M/s Schneider Electric's Premium TSX PLC and Wonderware's In touch SCADA along with a Recipe/Reporting package, developed in-house, was used to accomplish the precise process control and user-friendly Human-Machine Interface (HMI).

Accurate charging of the raw materials was achieved through 'Micromotion' flow meters connected to the PLC on 'Modbus'. Precise temperature control and vacuum control were attained through advanced process control functions such as Set Point Programmer, Advanced PID loops etc. in Modicon Premium PLC. The automatic filling of drums was accomplished using the integral weighing module in the Premium PLC. The step-by-step operation of the process, according to the selected recipe, is achieved through Supertech's 'Batch Management Software', which offers the facilities such as, creation of new recipe, modifying the existing recipe and deletion of the old ones. The reporting software furnishes the following management information reports :

- Batch Report
- Raw Material Inventory Report
- Product Quality Report
- Time Variance Report
- Material Variance Report
- Reactor Utilization Report



Project Overview

- Marketing Segment: Resins
- Location: Dubai, UAE
- Year Order: 2003



Success story



Implementation methodology (main phases):

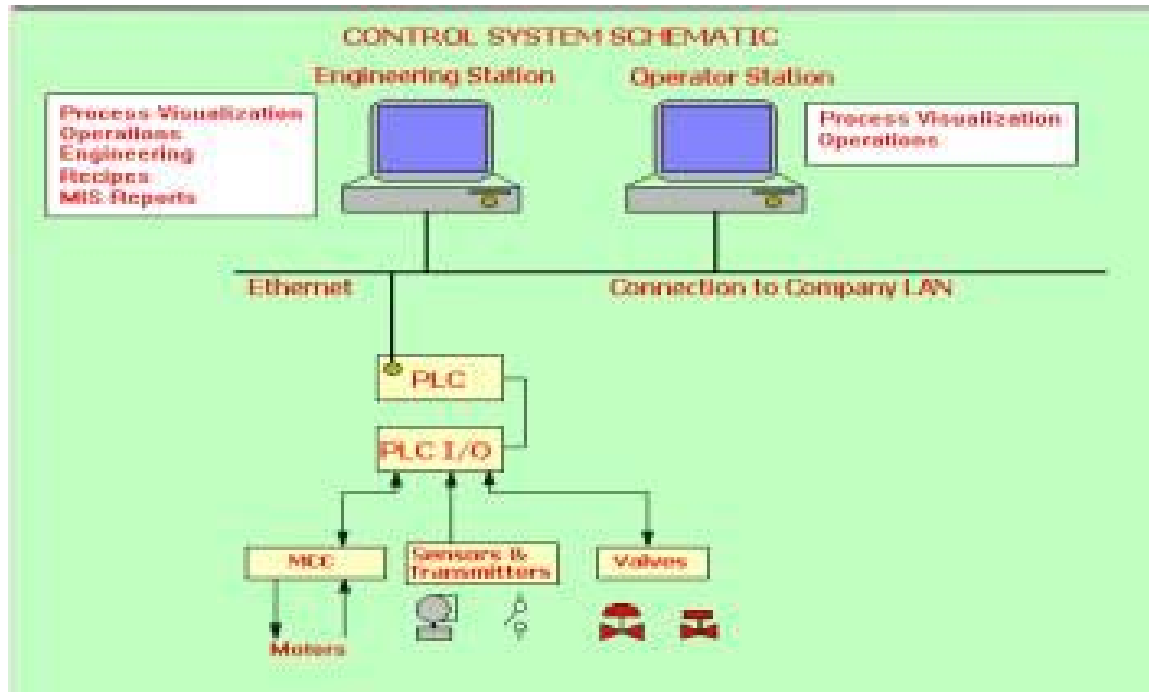
- **Concept and Design**
- **Application Software and Hardware Development**
- **Testing**
- **Commissioning**
- **Finalization**

Solution (services, products, systems, Architectures.....):

Besides the basic objectives of Improved and Consistent Product Quality for every batch, the PLC/SCADA based automation system has proved beneficial in several other areas such as:

- Reduction in Batch-Time is achieved by automating the tasks, wherever possible. Further, the event logging function, which logs and reports all operator actions, prompts the operators to be more alert and to adhere to the standard batch timings.
- Energy Saving is also realized due to use of Variable Frequency Drives (VFDs) and as a result of various automated processes.
- Recipe Software, developed by Supertech, facilitate creation of new recipes and modifications in the current recipes by the plant operators and does not call for services of Supertech.
- Reporting Software facilitates automatic generation of daily, weekly, monthly, batchwise operational and management reports.
- Historical Data of all batches is automatically stored for analysis purposes. Temperature profile of the batches is also made available for analysis and documentation.





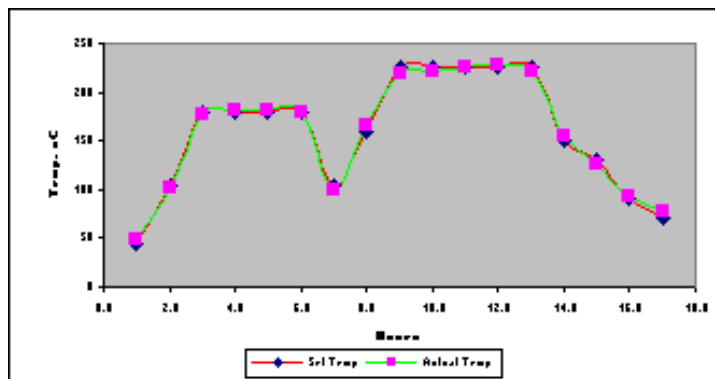
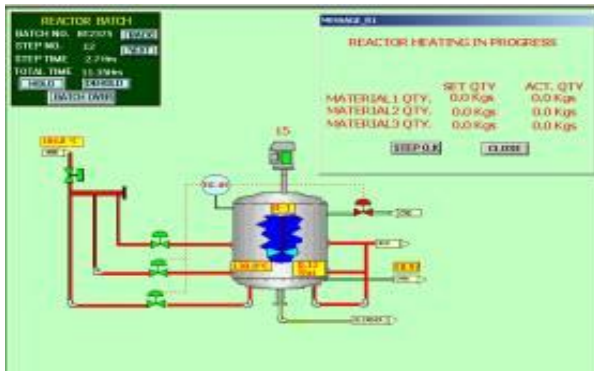
- Precise Temperature Control
- Accurate raw-material Charging
- Precise vacuum control

Success story

Results



Easy-to-Operate SCADA



Reactor Recipe

Product No. [RST123] Select Reactor: [Reactor 2] Date: [01/01/03] Created By: [SUPERTECH]

Sl. No.	Step Type	Message	Event	Time	Time	Set/Act	Material	Quantity
1	Manual Control	11 Reactor Stop	Check Temp TL	40	005	0		0
2	Manual Control	11 Bottom Valve	Check Temp TL	40	005	5		0
3	Manual Control	Set all valves L	Check All Utilities	40	005	50		0
4	Manual Control	Check Thermoc	Check Thermoc	40	005	2		0
5	Manual Control	Start heating up	Set Cnv. Tr	40	005	2		0
6	Manual Control	Set Valve For	Set Valve Tr	40	005	2		0
7	Auto Material C	Auto Material C	Charge Mat P L 6	40	005	80	6	4502
8	Manual Material	Charge Material	Charge Material 7	40	005	80	7	1884
9	Manual Control	Start Agitator S	Start Agitator	40	005	5		0
10	Manual Control	Start AG Parging	Start AG Parging	40	005	2		0
11	Manual Control	Set TPC at 150	Set TPC at 150	40	005	5		0
12	Manual Material	Charge Material	Charge Material	05	005	278	2	6200
13	Manual Control	Set TPC at 220	Heating Of Reac.	08	005	5		0
14	Time	Start heating of	Heating Of Reac.	154	108	108		0
15	Manual Control	Stop heating of	Heating Of Reac.	161	005	05		0

[OK]



The Highlights

- The automation system has been successfully commissioned and has been functioning since September 2003.
- The system can be upgraded or expanded in future.
- Ethernet communication between the PLC and SCADA offers connectivity to company intranet/internet or ERP system and thus offers plant data to be viewed by any PC without any additional software using the integral web server in the TSX Premium processor.
- M/s Schneider Electric is a world leader in automation and electrical systems, with operations in over 130 countries including Dubai. This ensures availability of spares and services, if required.
- Premium TSXP57203, a 32 bit Intel 486 based processor , offers advanced process control functions such as PID control with Auto-Tuning, Feed Forward Control, Cascade Control etc.

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