

**Process Design and Engineering  
Chemical / Mechanical**



- ⇒ Research and Development
- ⇒ Process Development
- ⇒ Process Flow Design and Piping and Instrument Diagrams (P&ID)
- ⇒ Heat and Material Balances
- ⇒ Vapor Recovery
- ⇒ Distillation
- ⇒ Extraction
- ⇒ Filtration
- ⇒ Crystallization
- ⇒ Fermentation
- ⇒ Absorption
- ⇒ Environmental Permitting
- ⇒ Process Safety Reviews

**Oxychem - Castlehayne, NC**

- Research and development of a proprietary hexavalent to trivalent chrome conversion process to reduce sodium sulfate to elemental sulfur, sodium carbonate and carbon dioxide.
- This project was started for environmental compliance issues but through R&D became a source of revenue generation from the sale of byproducts. This project had a two year return on investment.

**Dow-Corning - Carrollton, KY**

- Engineering and design of a pilot facility for production of a new silicone.

**BASF - Louisville, KY**

- Engineering and design to increase capacity and improve production quality for a major ink production facility. This project also included the elimination of EPA and OSHA issues.

**Pilot Chemical - Middletown, OH**

- Engineering and design of a sulfonation reactor project for the installation of a new process including structural, piping, electrical and controls.

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**Monsanto/Bayer - Cincinnati, OH**

- Engineering and design to duplicate an undocumented process from a shutdown plant including the relocation and reuse of existing tanks and equipment for the production of resin for plastic. The project included P&IDs, Process flow diagrams, piping, electrical and controls design.
- Project to identify contamination areas within major chemical/plastics facility. Investigated production lines, material handling, bagging and packaging areas. Recommended and designed equipment and pigging systems to bring the client to .001% contamination.
- Design of new grassroots facility for receiving raw material production, blending and warehouse storage of finished products for chemical facility. Additionally responsible for relocation of material logistics to minimize disruptions during construction phase.
- Survey bulk loading area redesign for elimination of contamination and waste.
- Grassroots design/construct project for major resins manufacturing. The project included tankage room, material handling, production, blending and packaging. All PLC controlled.

**Sika Corp. - Marion, OH**

- Complete engineering and design for a grassroots epoxy production facility including office, warehouse and production facility, rail spur design and environmental permitting.

**Hilton Davis - Cincinnati, OH**

- Fast track project to resolve EPA compliance issues threatening plant shutdown. Engineering and design to segregate the waste system and add air stripping columns to remove volatiles and reworked thermal oxidizer to eliminate VOCs and obtain zero stack emissions.

**Air Products - Cincinnati, OH**

- Construction management of liquid hydrogen unloading and storage facility from Procter & Gamble to Henkel.

**PMC Specialties - Cincinnati, OH**

- Engineering for a boiler renovation project. Designed new breechings, isolation dampers and a new stack to allow the coal fired boiler to be converted to natural gas while maintenance was being performed on the baghouse and flyash handling system.



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**GE Aircraft Engines - Cincinnati, OH**

Engineering to upgrade a metals treating lab, including tanks, scrubber, chemical transfer and material handling.

**Henkel Corporation - Cincinnati, OH**

- Engineering and design for a glycerin project to parallel an existing process for a new distributive controls system. This project had to maintain almost zero downtime and still reuse some existing equipment.

**E.M. Science - Cincinnati, OH**

- Distillation and boiler system for high purity reagent grade solvents for clean room and micro chip technology. This system was able to use metal technology instead of glass to obtain a higher purity solvent due to the use of higher temperatures obtainable in a metal system.
- Study to determine alternative methods to install a 480 volt plant distribution system to replace a 240 volt system including cost estimate recommendations.
- Tank farm emissions project.

**Morton International - Cincinnati, OH**

- R&D, design and engineering of a process to produce and transfer a filter cake utilizing centrifugal separation technology.
- Engineering and design of a continuous process for the production of PVC stabilizers. Systems were designed in a modular format to be shipped and installed in Indonesia.
- Engineering and design for a specialty chemical process to be installed in an existing facility. Included upgrading the facility to a Class 1 Div 1 area

**AK Steel - Middletown, OH**

- Engineering and design of an automatic ingot feeder on an aluminized steel coating line.
- Engineering and design of piping systems and feeder tanks.

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**GE Plastics - Mount Vernon, IN**

- Process and instrumentation improvements for the recommissioning of a plastic resins manufacturing facility that had been shutdown for several years. Project included determination of existing facility conditions and recommendations for repairs and replacement of existing components; process modifications to improve product quality and production rates and reinstrumentation of the facility. Project duties included scope development, cost estimation and cost control, procurement and construction management.
- Addition to an existing plastics compounding facility, plastics resins are blended with various liquid and dry modifiers and are fed into new extruders to produce engineered thermoplastics. The project included demolition of a portion of an existing warehouse building in order to construct a new multi-story addition to the adjacent compounding building. The addition houses bulk storage silos and tanks, blending tanks, mixers, PLC controlled feeders and extruders. Tie-ins to existing systems were made with minimal downtime to existing production operations.

**Corning, Inc. - Wilmington, NC**

- Engineering, design and installation of a new process that removes and recovers Germanium Tetrachloride from 20% Hydrochloric acid.

**Dover Chemical Corporation - Dover, OH**

- Complete engineering and design for a grassroots plant to produce liquid organic phosphates flame-retardants. This project encompassed all engineering disciplines, and included preparation and acquisition of all building permits, bid packages/purchase orders for all equipment and construction services, and field construction management.
- Engineering and design services for a high temperature process for production of a bulk product additive for plastics. Design and services included all piping stress analysis, preparation and acquisition of all building permits, construction management, bulk product blending and automated packaging, hot oil thermal fluid systems, and dust collection systems.

**Cincinnati Paperboard - Cincinnati, OH**

- Preparation of EPA Title V environmental permitting.



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**Color Intermediates- Cincinnati, Ohio**

- Design for process expansion: included building addition; process design for new reactor, dust collection system, cooling tower, product dryer, and hot oil system modifications; electrical & controls design; programming modifications to existing Foxboro IA system; building permits preparation and approvals.
- Feasibility study with capital cost estimate for dichlorobenzidine manufacturing plant capacity increase.

**BF Goodrich (Hilton Davis)- Cincinnati, Ohio**

- Design of automated process to handle/charge dichlorobenzidine from fiber drums to reactor. Included design of air-tight room, automated transfer/placement/dumping of fiber drums, dust control system, electrical & controls. The drum dumping system was PLC controlled, with overall system design required for remote operator interfacing.
- Design of sewer effluent flow and color monitoring station, including civil, mechanical, and electrical disciplines.

**Henkel Corporation- Cincinnati, Ohio**

- Design of grassroots plant for production of purified esters products. Project included demolition of existing facilities, architectural design of new 5 story building, civil and structural design for building and equipment support, all equipment design and specifications, piping, electrical and controls designs, preparation of all bid packages, and building fire protection system. Systems included hot oil, evaporator, stripper, filtration, vacuum, cooling tower, transfer panels, and supporting equipment for these operations.

**DAP Corporation- Dayton, Ohio**

- Provided critical rebuild/retrofit services following plant fire: services included HAZOP and codes review, design of ventilation system with LEL detection, grounding system for equipment/piping/drum filling, dust collection system, bag dump station w/ access platform for reactor, and design review of storage tank protection.

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**Ace Paints- Chicago, Illinois**

- Design services for paint plant modernization. Design included building for detached tank farm: architectural, civil, structural, HVAC and utilities systems, process piping design; revamp of truck unload area, including architectural/structural to enclose area, electrical, HVAC, and drainage system; revamp of process area to allow installation of two new dispersers and final mix tanks, electrical, fire protection modifications, dust collection system, utilities systems; design and installation details for new plant service transformer, truck and unloading areas revamp.

**Elf Atochem- Carrollton, Kentucky**

- Design and layout of mezzanines for the addition of two new reactors.
- Review of several buildings and operations handling flammables & combustibles: provided summary of requirements based on building codes and NFPA.
- Design of structure for a new 400 ft pipe bridge to provide transfer from a new truck unload area to the plant tank farm.

**Formica Corporation - Cincinnati, OH**

- Melamine Resin Treater: Architectural, structural, mechanical and electrical design and construction management for the installation of a converting line to impregnate overlays and decorative surface papers with melamine resins.
- Surface Paper Roll Handling System: Engineering and construction management for a system to aid in the unloading of treated rolls from the dry end of two melamine treaters. System allows one operator to remove rolls from the shaft and add protective covering.
- Melamine Resin Delivery System: Engineering and construction management for a system to automatically mix the proper amount of catalyst to raw melamine resin and to mix granular aluminum oxide into catalyzed resin and deliver the resins to four melamine treating lines.
- Phenolic Treater: Engineering and construction management for the installation of a converting line to impregnate filler papers with phenolic and automatic release coat resins.
- Regenerative Thermal Oxidizer System (RTOS): Engineering and construction management for a RTOS to thermally oxidize the volatile organic compounds in the exhaust gas stream for the Phenolic Treater.



**Formica Corporation - Cincinnati, OH**

- **Automatic Release Coat Resin Delivery System:** Original design development of a system to mix and deliver an automatic release coat resin to the Treater. The release coat resin is to be applied to one surface of the filler paper to allow for the release of the back to back pressed high pressure laminate sheets. This will eliminate the use of wax paper in current production.
- **Automatic Surface Set Cutting and Collation:** Engineering construction management and start-up of a system to take up to three different rolls of surface papers and automatically thread the webs through a cross cutter to cut the sheets to proper length; ultrasonically "weld" the sheets into a surface set and automatically stack the surface sets face to face and back to back on a board in the proper sequence of a desired laminate press run.