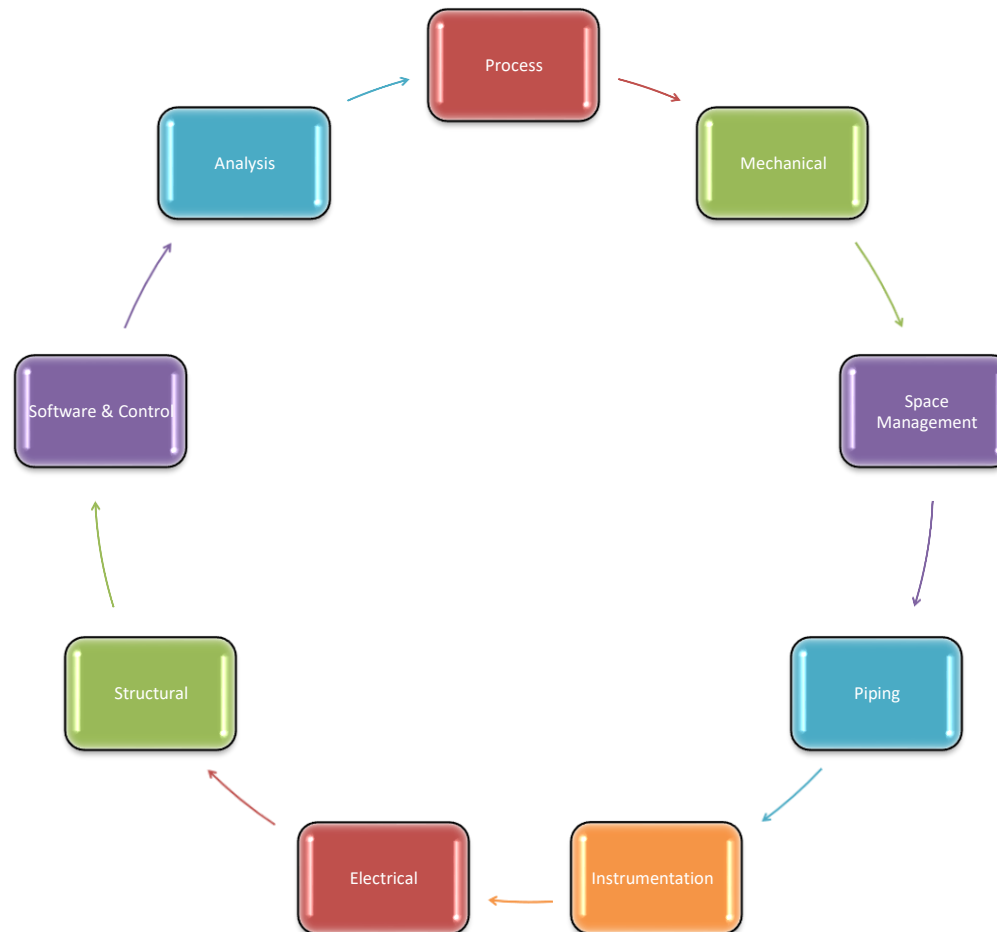


# All In House Multidisciplinary Capabilities

Biopharmax offers a complete multi-disciplinary engineering solution utilizing advanced software for analysis, design, detailing, plant 3D modeling and drafting.

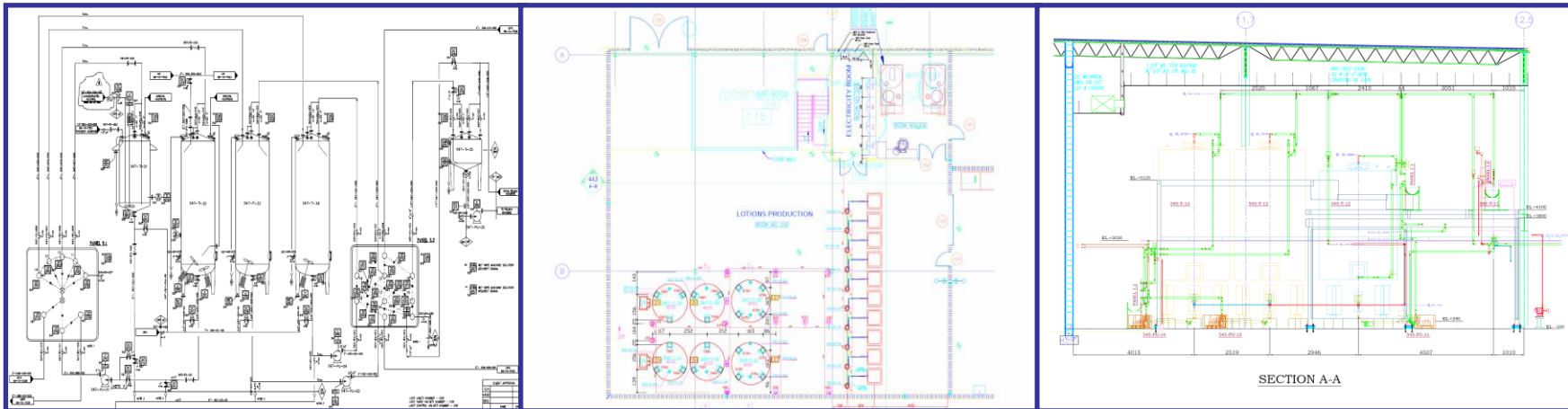


# Process

Biopharmax process department provides detail engineering services for all industrial segments.

Typical detail engineering documents and tasks include:

- Development of P&ID's based on FEED
- Preparation of P&ID's for utilities
- Sizing calculations
- Hydraulic calculations
- Performing insulation and heat tracing calculations
- Preparation of line list, equipment list, valve list, etc.
- Preparation of plant operation and maintenance manual



# Mechanical

Biopharmax mechanical design department delivers design and detail engineering of static and rotating equipment, packages, and HVAC, our team is familiar various international codes and standards.

Common detail engineering documents include:

- Mechanical data sheet preparation
- Preparation of general arrangement drawings
- Technical clarifications during contract finalization
- Final mechanical design verification of compliance with international codes
- Strength calculations
- Detailed manufacturing drawings
- Preparation of bill of materials
- Specifications for raw materials
- Purchase specifications
- HVAC

# Piping Design & Equipment Layout

Biopharmax piping design department offers design and detail engineering services for all industry segments.

Detail engineering documents prepared by our staff include:

- Piping material specifications
- 3D model project set-up
- Piping studies
- Equipment lines modeling
- Nozzle orientation drawings
- Interface with other disciplines
- Stress analysis
- Pipe supports
- Clash checking
- Model reviews
- Isometrics
- Bill of materials
- Piping general arrangement drawings
- Piping material take-offs
- Support material take-off

# Electrical

Biopharmax electrical department provides design engineering services for all industry segments.

Typical detail engineering documents and tasks include:

- Design basis
- Project specification
- Load flow studies
- Selection of HV/LV switchgear and motor control centers
- Selection of AC/DC UPS
- Selection of power
- Selection of distribution transformers
- Cable tray / trench layouts
- Cable routing layouts
- Lighting (indoor/outdoor) layouts
- Power and control cable schedules
- SCADA I/O list
- Selection of feeder /motor / transformer protection relays
- Switchyard / transformer layouts
- Switchgear / MCC room layout

# Instrumentation

Biopharmax Instrumentation department provides design engineering services for all industry segments.

Typical detail engineering documents and tasks include:

- Design basis
- project specification
- Control philosophy
- Detailed execution drawings
- Instrument index and elevation plan
- Interlock logic diagrams
- Cable tray / cable trench layouts
- Junction box termination drawings
- Instrument hook up drawings
- Cable schedules
- Fire and gas drawings
- Technical bid evaluation
- Review of vendor package systems
- Sizing of control valves, orifice plates, and relief valves
- Bill of materials
- Attending SAFOP / HAZOP meetings
- FAT and SAT procedures

# Structural

Biopharmax civil and structural department offers design and detail engineering services for all industry segments.

Our staff has prepared design calculations and detailed structural drawings, fabrication drawings, bar bending schedules, and bill of materials consistent with international standards for:

- Preparation of design basis
- Preparation of project specification
- Reinforced concrete framed structures
- Pile and conventional foundations
- Equipment and machinery foundations
- Concrete storage silos and large diameter storage tank foundations
- Retaining, dyke, and boundary walls
- Cable and pipe trenches and tunnels
- Roads, pavement, grading plans, and drainage systems
- Gates, compound walls, and fencing
- Steel framed buildings and superstructures
- Pipe and cable rack, conveyor galleries, trestles, stack supporting and platforms.

# As-Built Engineering

Biopharmax has extensive experience with large as-building projects, updating engineering records to match conditions in the field. Our staff is skilled in traditional techniques such as manual survey and redlining, as well as the latest technology such as laser scanning.

Biopharmax as-built services include:

- As-built engineering from cloud point data
- Site survey and redlining
- Updating drawings as per red line markups
- Creation of intelligent P&IDs
- 2D drawing conversion

