

# Koch Modular Process Systems, LLC



**Purification, Separation, and Recovery Processes  
Distillation, Extraction, Absorption, and Stripping**

*Koch Modular Systems, LLC is a Joint Venture between a wholly owned subsidiary of  
Koch-Glitsch and Modular Process Systems, Inc. formed January 1, 1999*

## CORPORATE PROFILE

Koch Modular Process Systems, LLC is a company founded to serve the Pharmaceutical and Chemical Process Industries by fulfilling today's increasingly challenging separations requirements. Each of our corporate officers is a degreed chemical engineer with an average of 25 years experience in mass transfer process equipment design. Our business is built on the unique problem solving skills of our process engineers. We complement our strength in process design with a project management team experienced in all aspects of modular construction.

## PRODUCTS AND SERVICES

We specialize in the supply of fully preassembled modular mass transfer systems that have been custom engineered to meet your specifications. These systems can range in size from semi-works to full scale production units. The modules supplied contain all equipment including columns, exchangers, pumps, and tanks, mounted within structural steel framing with piping, instrumentation, and electrical wiring preinstalled.

As a single-source supplier we provide you with the following services:

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|--|--|
| ■ Feasibility studies                      | ■ Process design and performance guarantee         |
| ■ Detailed engineering                     | ■ In house pipe stress and finite element analysis |
| ■ Project management                       | ■ Modular construction                             |
| ■ Startup assistance and operator training | ■ Continued service and advice                     |

## TECHNOLOGY EXPERTISE

In order to give each customer the best solution to their specific problem our process engineers evaluate many different technologies:

- **Distillation** - continuous, batch, vacuum or pressure
- **Extractive Distillation**
- **Azeotropic Distillation**
- **Reactive Distillation**
- **Liquid-Liquid Extraction** - continuous multistage, single stage, fractional
- **Absorption** - water soluble organics from vent gas, hydrocarbons from air
- **Stripping** - steam stripping of organics from process streams or waste water

When Vapor-Liquid Equilibrium (VLE) or Liquid-Liquid Equilibrium (LLE) data is not available in the literature, we can provide low-cost laboratory development of this data. This will allow our process engineers to optimize the solution to your problem by exploring a wide range of design options. Piloting can then be used to confirm a design if necessary. We have successfully designed and built many systems strictly on the basis of literature or developed VLE and LLE data.

## APPLICATIONS

We service the pharmaceutical, specialty chemical, flavor/fragrance, plastics/resins, food, industrial gas and hydrocarbon manufacturing industries with typical applications such as:

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|--|---|
| ■ Binary and Multicomponent Separations                      | ■ Solvent Purification Systems                            |
| ■ High Vacuum Distillation                                   | ■ Product Purification                                    |
| ■ Solvent Drying   | ■ Carbon Dioxide Recovery                                 |
| ■ Acid Gas Removal from Syngas, Natural Gas, Flue Gas or LPG | ■ Steam Stripping of Volatile Organics from Process Water |

## SEPARATIONS EXPERIENCE

The following is a partial list of compounds our engineers have design experience with:

- **Alcohols** - methanol, ethanol, propanols, butanols, amyl alcohol, hexanols, and higher linear paraffin alcohols, methoxy alcohols, ethoxy alcohols.
- **Ketones** - MEK, acetone, MIBK, cyclohexanone.
- **Aromatics** - benzene, toluene, styrene, xylenes, alkylbenzenes, naphthalene, methyl naphthalene.
- **Aliphatics** - methane, ethane, propane, pentane, hexane, heptane, decane.
- **Acetates** - methyl acetate, ethyl acetate, propyl acetates, butyl acetates, amyl acetate
- **Chlorinated Hydrocarbons** - methylene chloride, chloroform, carbon tetrachloride, ethylene dichloride, thionyl chloride, trichloroethane, trichloroethylenes.
- **Phenolics** - phenol, cresols, xyenols, ditertiary butyl phenols, nitrophenol.
- **Others** - acetaldehyde, acetic acid, acetic anhydride, acetonitrile, amides, amines, ammonia, aniline, aroma chemicals, carbon dioxide, cumene, cyclohexane, dioxane, DMAC, DMF, DMSO, formaldehyde, formic acid, geraniol, glycols, H<sub>2</sub>S, HBr, HCN, indene, ionones, isophorone, isopropyl ether, limonene, linalool, methyl bromide, methyl indenenes, methyl ionones, n-methyl pyrrolidone, nitroethane, nitromethane, nitropropanes, nitrobutanes, nitrotoluene, picolines, piperidine, pyridines, refrigerants, terpenes, THF, water, vegetable oils.

## ADVANTAGES OF MODULAR CONSTRUCTION VS. FIELD CONSTRUCTION

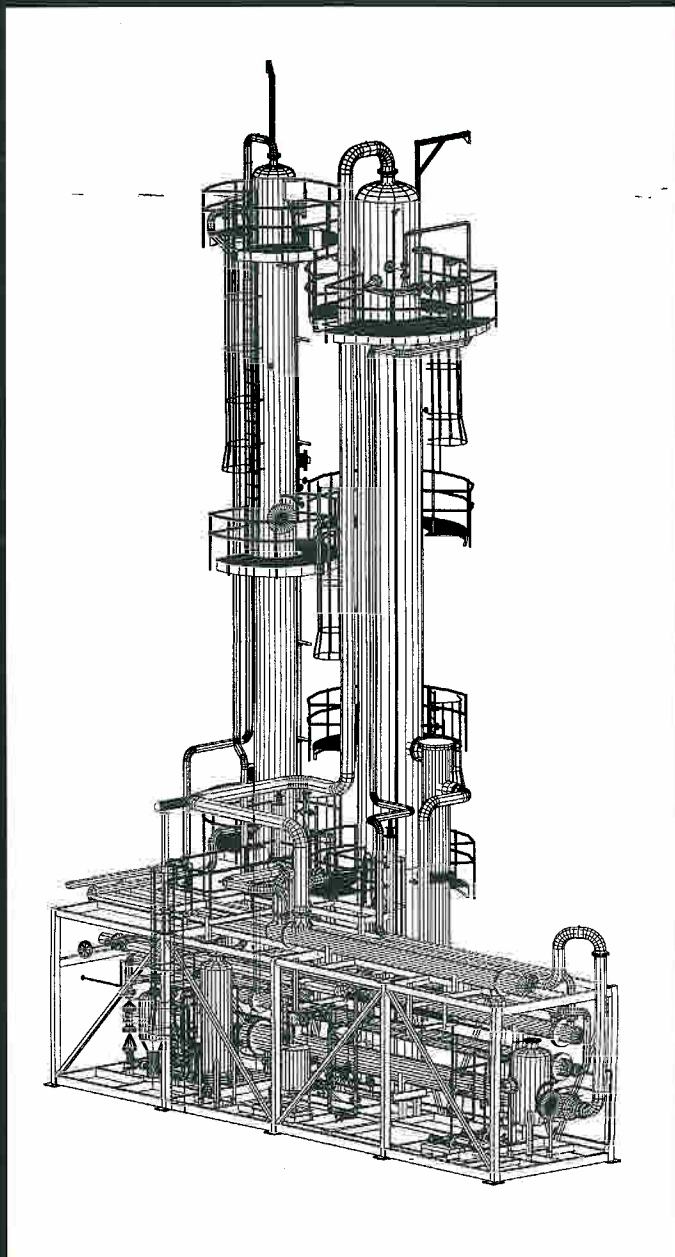
- Lower cost/lump sum bid
- Schedule compression
- Minimal plant site interruption
- Construction proceeds while waiting for permits
- Single source responsibility
- Progress of work unaffected by weather or labor conditions

## DETAILED ENGINEERING AND DOCUMENTATION

We provide a comprehensive documentation package. All drawings are available on diskette per the latest release of AutoCAD®. A typical package will include:

- Design Calculations & Simulation Output
- Process Flow Diagram
- Process & Instrument Diagrams
- Vessel Drawings and Equipment Specification Sheets
- Equipment General Arrangements
- Piping Plan Drawings & Isometrics
- 3-D Model of Entire System in AutoPLANT®
- Structural Steel Drawings
- Electrical Drawings and Instrument Package
- Operating and Maintenance Manuals



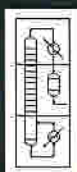


*This Syngas purification system which also produces food grade CO<sub>2</sub> was completely modeled by Koch Modular Process Systems' piping designers using AutoPLANT® 3D computer aided design software. The database created using this software enables our designers to easily generate piping plans, elevations, and isometrics with a complete bill of materials. The customer can also visualize the entire plant before construction starts.*

*Front cover: This modular ethylene glycol distillation system, which treats a waste stream for a US fiber producer removing low and high boiling impurities, is being prepared for shipment at our module assembly shop. The system employs a Turba-Film® thin film evaporator supplied by LCI Corporation to remove solids from the feed stock. The process technology was developed by Koch Modular Process Systems' engineers.*



*As a result of utilizing modular design and fabrication techniques for this multipurpose batch and continuous vacuum distillation system, Koch Modular Process Systems was able to significantly reduce the installed cost and shorten the construction schedule for the expansion project of this specialty chemicals manufacturer.*



## Koch Modular Process Systems, LLC

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