

Koch Modular Process Systems, LLC.

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

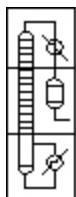
Koch Modular Process Systems, LLC. (KMPS) specializes in the design and supply of modular mass transfer systems engineered to fulfill the Chemical, Pharmaceutical, Petrochemical, Biotech, Food and Flavor & Fragrance Industries' increasingly challenging purification requirements.

KMPS custom engineers every modular distillation and chemical separation system specifically for each application. All products are sold with a Process Performance Guarantee. Our systems are typically designed for solvent recovery, chemical purification, steam & wastewater stripping: NESHAP, PEG, MACT and environmental regulation compliance, carbon dioxide & acid gas absorption and more. Our technical expertise includes binary and multicomponent distillation, extractive distillation, azeotropic distillation, reactive distillation, liquid-liquid extraction, absorption, stripping, heat transfer, fluid flow, instrumentation and controls.

KMPS can also provide process studies, laboratory and pilot plant testing, VLE development and complete process design engineering packages.



Difficult separations are our specialty!



K M P S

Koch Modular Process Systems, LLC.
45 Eisenhower Drive, Paramus, NJ 07652
Tel: 201-368-2929 Fax: 201-368-8989
Website: www.modularprocess.com
Email: systems@modularprocess.com

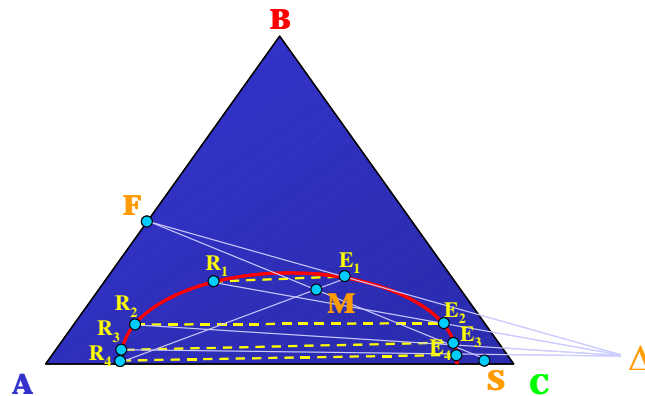
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ABOUT US

Objective:

Provide economic solutions to separation problems.



Full Range of Services

- Modular Systems
- Feasibility Studies
- VLE/LLE Development
- Process Simulations
- Process Design
- Pilot Plant Testing
- Shell & Tube HX Design
- Equipment Design
- Detailed Engineering
- 3D CAD Modeling
- Project Management
- Startup & Training

Process Expertise

- Distillation
- Liquid-Liquid Extraction
- Steam Stripping
- Absorption

Who We Are:

Chemical Engineers:

- Process – 16
- Project – 10
- Controls – 2
- Proposals – 5

Other Engineers:

- Mechanical – 5
- Civil/Structural – 4
- Electrical – 1
- Instrumentation – 1

Design Drafting:

- Piping Design – 9
- Vessel – 4
- Structural – 2
- Process/P&ID – 4

Quality Assurance:

- Quality Control – 2
- Document Control – 1

Accounting

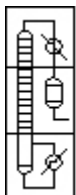
- Controller – 1
- Assistant – 1

Administrative:

- Purchasing – 3
- Assistant – 2
- Human Resources – 1

Pilot Plant Personnel:

- Operators – 3
- Analytical Chemist – 1
- Pilot Plant Manager – 1



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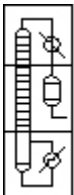
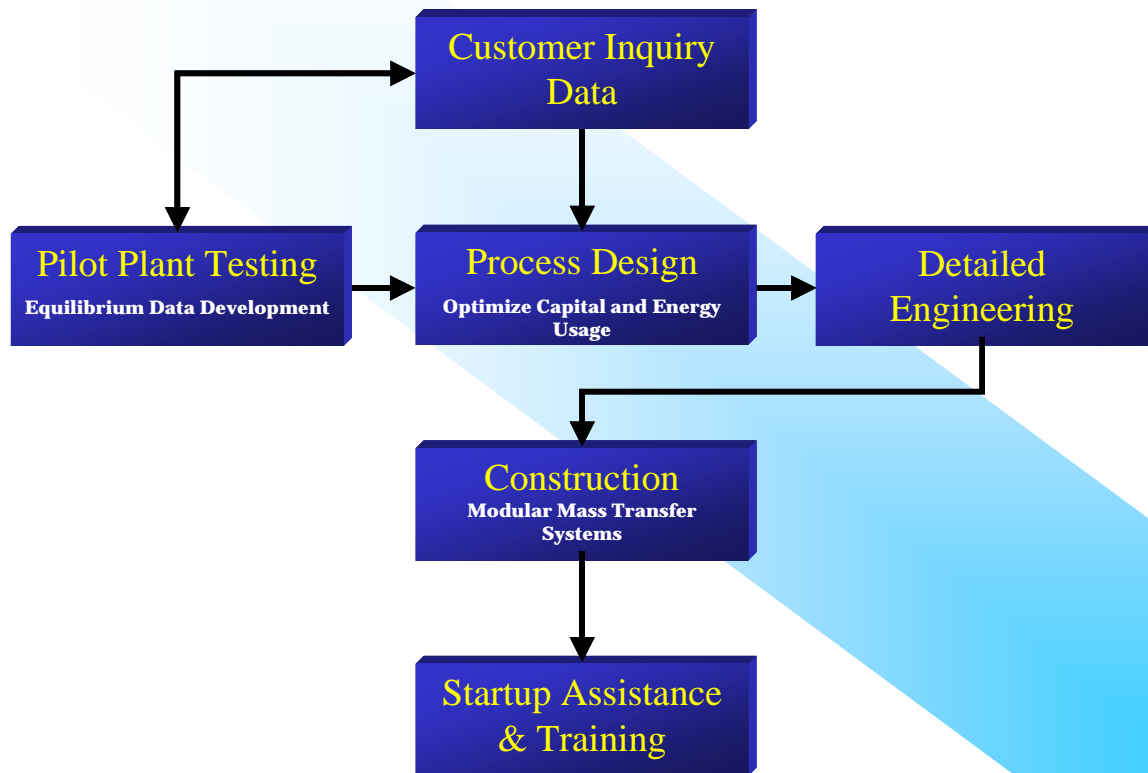
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How We Do It:



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PRODUCTS AND SERVICES

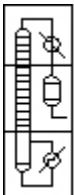
We specialize in the supply of fully pre-assembled modular mass transfer systems that have been custom engineered to meet your specifications. These systems can range in size from semi-units to full scale production units. Depending on the customizations requested, the modules supplied may contain all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

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

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



KMPS is also an experienced source at providing solutions for thermal design or rating of shell and tube heat exchangers. Whether you have an existing heat exchanger (reboiler, condenser, etc.) that is experiencing a performance problem (such as excessive pressure drop, vibration, poor heat transfer coefficient, etc.) or is limited in capacity, or whether you are trying to optimize the design of a new heat exchanger, KMPS can provide the thermal design for you using ASPEN B-JAC™ software, and can supply you with the optimum solutions for your design requirements.



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TECHNOLOGY EXPERTISE

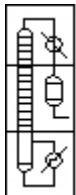
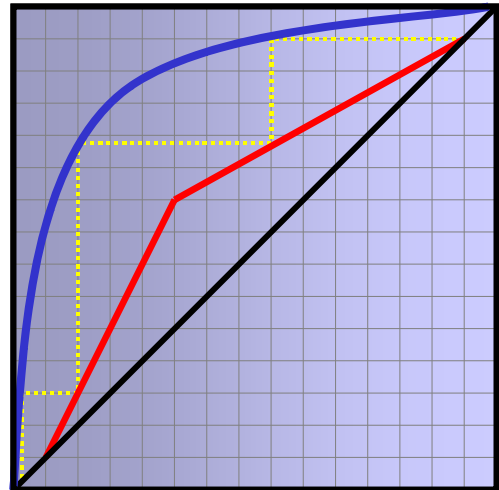
In order to give each customer the best solution, our process engineers can evaluate many different technologies:

- Distillation - continuous, batch, vacuum or pressure
- Azeotropic Distillation
- Extractive Distillation
- Reactive Distillation
- Liquid-Liquid Extraction - continuous multistage, single stage, fractional
- 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 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. Pilot Plant testing 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.

Industrial Applications for Our Process Expertise:

- High Vacuum Separations of Citrus Oils and Flavor & Fragrance Products
- Solvent Recovery Systems
- Aqueous Waste VOC Removal
- Pharmaceutical Intermediates
- Multicomponent Separations
- Solvent Drying
- Pilot Plants/Semi-Works
- Purification of Organic/Inorganic Products
- Organic/Inorganic Chemical Manufacture
- Acid Gas Treating (aMDEA licensee)



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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, isopropyl alcohol, 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

Citrus Oils - alpha-pinene, sabinene, myrcene, octanal, d-limonene, octanol, linalool, nonanal, alpha-terpiniol, decanal, neral, geraniol, dodecanal, valencene, cadinene, nootkatone, alpha-sinensal, beta-sinensal

Phenolics - phenol, cresols, xylenols, ditertiary butyl phenols, nitrophenol

Acid Gases - CO₂ & H₂S

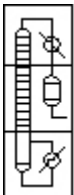
Others - acetaldehyde, acetic acid, acetic anhydride, acetonitrile, amides, amines, ammonia, aniline, aroma chemicals, cumene, caffeine, cyclohexane, DCPD, dioxane, DMAC, DMF, DMSO, formaldehyde, formic acid, glycols, HBr, HCN, indene, ionones, isophorone, isopropyl ether, methyl bromide, methyl indenenes, methyl ionones, n-methyl pyrrolidone, nitroethane, nitromethane, nitropropanes, nitrobutanes, nitrotoluene, picolines, piperidine, pyridines, refrigerants, terpenes, THF, water, vegetable oils.

Full Range of Services

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Process Simulations
Process Design
Pilot Plant Testing
Shell & Tube HX Design
Equipment Design
Detailed Engineering
3D CAD Modeling
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Liquid-Liquid Extraction
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ADVANTAGES OF MODULAR CONSTRUCTION

Why would you choose modular construction from KMPS over conventional field construction? Here are 5 of the most common reasons our customers give:

Shorter Schedules

Building a process unit in a shop, with a well controlled fabrication sequence, can save months when compared to building outside in a plant environment where work is subject to weather related delays, work permits, work stoppages, waiting for cranes, etc. Fact: KMPS just shipped a complete 316SS solvent recovery system for a custom pharmaceuticals manufacturer in 12 weeks!! (from PO, through all design engineering and fabrication)



Lower Cost/Lump Sum Bid

KMPS has made a science out of studying fabrication efficiencies and construction sequences in our module shops. Typically a 25% reduction in cost can be realized with modular construction when compared to field construction. Prices quoted for modular construction are also firm/lump sum prices.

Construction Proceeds While Waiting for Permits

Offsite construction of entire process units in our module shop can proceed while permits are in-process. This can be a significant time saver because permits often take months to obtain and field construction can't begin until the permit is in hand.

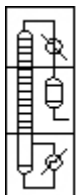
Minimal Plant Site Interruption

In the case where a new process unit is built alongside of an existing operating chemical manufacturing unit, there are many hazards and safety risks associated with the field construction activities. Ask yourself this question: "Do I want dozens of contract construction workers walking around in my chemical plant?" If the answer to this question is no, then modular construction (offsite) makes a lot of sense. It minimizes the potential hazards and production interruptions that can occur.

Single Source Responsibility

Is your project manager/project organization stretched to the limit? Building your process unit in our module shop will unload your project team because you will place only one purchase order. Our project team will do the

Did you Know?? Modular units are also quite versatile. Although most of our modules are installed outdoors many are also installed inside of a building.



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