

# Solvent Recovery Adsorption and Distillation Systems



*Exceed EPA Emission Control Standards and Recover Virtually all of your Solvents for Reuse*



**R**ecover up to 99%+ of all your solvents for re-use. Exceed regulatory requirements by removing VOCs or HAPs from your manufacturing process emission. Increase profitability by virtually eliminating solvent expense. This is what a MEGTEC solvent recovery system will mean to you. These systems are based on today's most advanced and reliable adsorption and distillation technologies. They are site-specific and add long-term value to your manufacturing operation allowing you to produce high quality solvent-based products. These are clear competitive advantages found with MEGTEC solvent recovery systems.

*The bottom line is process knowledge*

# Solvent Recovery Adsorption and Distillation Systems



*Oxidizer and skid-mounted carbon adsorption system controlling emissions from coating operation*



*Distillation column at pharmaceutical manufacturing plant*



*Large, 90,000 CFM, turnkey, solvent recovery system at adhesive tape manufacturing facility*

## Performance Benefits

- Exceed EPA emission control requirements for environmental compliance
- Recover solvents for reuse for reduced manufacturing costs
- Wide range of airflows and solvent loadings
- Suitable for wide variety of solvent types
- Very high emission control and recovery efficiencies
- High turn down ratio
- Materials of construction for minimal maintenance and extended equipment life
- Designed for ease of maintenance and operability

## Carbon Adsorption: The Natural Method of Solvent Recovery

Carbon adsorption is based on a natural phenomenon in which volatile organic compounds are adsorbed from an air stream in the microscopic pores of activated carbon and released when heated for recovery. Activated carbon is the most versatile of all adsorbents because of its broad pore size distribution and pore volume. Consequently it is suitable for solvents with a wide range of boiling points and chemical structures such as Alkanes, Alcohols, Esters and Ketones, Cyclic compounds and Halogenated solvents.

## For Virtually any Process Generating Solvent-Laden Air

Carbon Adsorption is the ideal VOC/HAP emission control solution for manufacturing processes that utilize valuable solvents that when recovered could be reused in the process, generating substantial savings over other emission control methods where the solvents are destroyed.

Carbon Adsorption is also ideal for VOC/HAP emission systems from manufacturing processes that emit Halogenated solvents that would be very costly to oxidize due to the by-products that would be formed, the peripheral equipment that would be needed and the capital cost associated with this.

## Manufacturing Processes in this Category are:

- Publication gravure printing
- Packaging gravure printing
- Paper, film and foil coating
- Pharmaceutical
- Chemical
- Rubber-coated fabrics
- Magnetic media

- Film and fiber
- Membrane
- Semiconductor & electronics
- Foam
- Degreasing
- Soil vapor extraction and ground water remediation

## Continuous and Automatic Processing of Solvent-Laden Air

A typical solvent recovery process consists of an activated carbon adsorption unit with two, but as many as seven adsorber vessels and, if required, an air stripper or distillation unit.

Solvent-laden air passes through a number of adsorber vessels in parallel, where the solvent vapors are adsorbed by specially selected activated carbon. Once the carbon in an adsorber is saturated and solvent starts to slip, as detected by an optional gas analyzer, the solvent-laden air is routed to a stand by an adsorber and the saturated adsorber is regenerated.

Regeneration is accomplished by sending steam through a saturated adsorber, which heats the carbon, which in turn causes the adsorbed solvents to be released. The steam and solvent vapors that flow from the vessel are condensed into a liquid and cooled.

Water immiscible solvents are separated from the water in a decanter and collected for reuse. The water may be treated in an air stripper to remove small amounts of dissolved solvent before disposal or reuse to produce steam.

Solvents that are water miscible are separated from the water and purified in a distillation system.



*Skid mounted, 6,400 CFM, solvent recovery system at fiber manufacturing facility*



*Solvent recovery system (carbon adsorption system and distillation system) at pharmaceutical firm*



*Skid mounted, 2,400 CFM, solvent recovery system at chemical manufacturing facility*

## **Complete Systems for Separation and Purification**

Water soluble solvents and multiple solvent mixtures may need to be separated from the water and/or separated into their individual components prior to reuse. MEGTEC offers complete extractive and azeotropic multi-component distillation systems for the separation and purification of solvents mixtures. Depending on customer and process requirements, these systems can be designed for either continuous or batch operations.

In applications where the decanted water phase contains solvent levels which cannot be sent directly to drain or existing water treatment facilities, MEGTEC provides a steam or air stripping column for solvent removal.

In steam stripping, steam is admitted to the base of the column. As the contaminated feed water flows downward, solvents concentrate in the top of the column and are removed overhead to a condenser. The product then may be sent to storage or returned to the decanter.

In an air stripping operation, air is passed through the column counter-current to the flow of liquid. Solvent transfers to the air stream, which may be returned to the inlet of the carbon adsorption unit and purified water suitable for disposal is discharged.

## **Meeting your Exact Requirements and Space Constraints**

MEGTEC Solvent Recovery systems are available in a wide range of flows and configurations to meet any requirement or space constraint.

Custom-designed units handle air stream flows from 500 cubic feet per minute (CFM) to 1,000,000 CFM.

All MEGTEC systems utilize the highest quality components and fabrication technologies. The result is a proven 99% up time.

## **Turnkey, Pre-assembled Skid-Mounted or Field Erected Large Systems**

MEGTEC designs and builds completely pre-assembled skid-mounted systems for installation by their customer in sizes up to 20,000 CFM. MEGTEC designs, builds, installs, and commissions larger systems on a total turnkey basis, from foundations through an operating system. MEGTEC has considerable experience in the design and installation of solvent-laden air collection duct systems, as well as the supply and installation of solvent storage tank farms and utility generation equipment, such as boilers, cooling water systems, etc.

## **Flexible Controls and Instrumentation to Meet your Most Stringent Specifications and Standards**

MEGTEC's control systems are designed, built and debugged entirely in-house. This means that your most stringent specifications and standards will be met by MEGTEC engineers. Programmable logic controllers (PLC), operator interface software packages and other key components are selected on the basis of performance, cost, operator familiarity and compatibility with systems currently at your facility. Microprocessor-based, pre-programmed process controls minimize operator intervention for even greater simplicity. A variety of local remote instrumentation/controls for monitoring temperatures, pressures, tank/column levels, utility flow rates and other process parameters are also supplied. MEGTEC can assist in trouble shooting via modem from its offices.

## **Materials Of Construction that Meet your Exact Requirements**

MEGTEC fabricates its adsorption and distillation systems with materials of construction selected to meet your specific requirements. Included are carbon steel, stainless steel (304, 316, 2205, AL6XN), Hastelloy, Titanium and other commercially available alloys. Combinations of these materials often represent the most economical and viable system solutions. Your system will be fabricated from the materials necessary to ensure the highest quality and reliability as well as being cost-effective and flexible for future requirements.

## **Unequaled Customer Service and Support**

From field assistance during start-up through extended warranties and service contracts, MEGTEC provides unequalled customer service and support during all phases of a project, as well as after sales service. The result is a site-specific solvent recovery system that reduces your operating expenses and adds long-term value to your manufacturing operation.

## **Optimization of Competitor Systems and Activated Carbon Replacement Services**

MEGTEC also offers its services to survey competitor systems and optimize their operation through improved controls and energy recovery systems.

In addition, MEGTEC provides activated carbon services (removal and screening) as well as top up and replacement activated carbons.

# Solvent Recovery Adsorption and Distillation Systems

## AMERICAS

### United States

**MEGTEC Systems, Inc.**  
Telephone: +1-920-336-5715  
Toll-free: +1-800-558-2884

**Solvent Recovery Division  
MEGTEC Systems, Inc.**  
Telephone: +1-772-567-1320

### Brazil

**MEGTEC Systems, Inc.**  
Telephone: +55-19-3885-6116

## EUROPE

### France

**MEGTEC Systems SAS**  
Telephone: +33-1-69-89-4793

### United Kingdom

**MEGTEC Systems, Ltd.**  
Telephone: +44-1628-59-1700

**MEGTEC Environmental Ltd.**  
Telephone: +44-1257-42-7070

### Germany

**Sequa GmbH & Co.  
MEGTEC Systems KG**  
Telephone: +49-6181-94040

### Sweden

**MEGTEC Systems AB**  
Telephone: +46-31-65-7800

**MEGTEC Systems Amal AB**  
Telephone: +46-532-62900

## ASIA-PACIFIC

### Singapore

**Singapore Sales Branch -  
MEGTEC Systems SAS**  
Telephone: +65-6298-4666

### China

**MEGTEC Systems (Shanghai) Ltd.**  
Telephone: +86-21-6769-7878

### India

**MEGTEC Systems India Pvt. Ltd**  
Telephone: +91-20-662033-70 (71, 72)

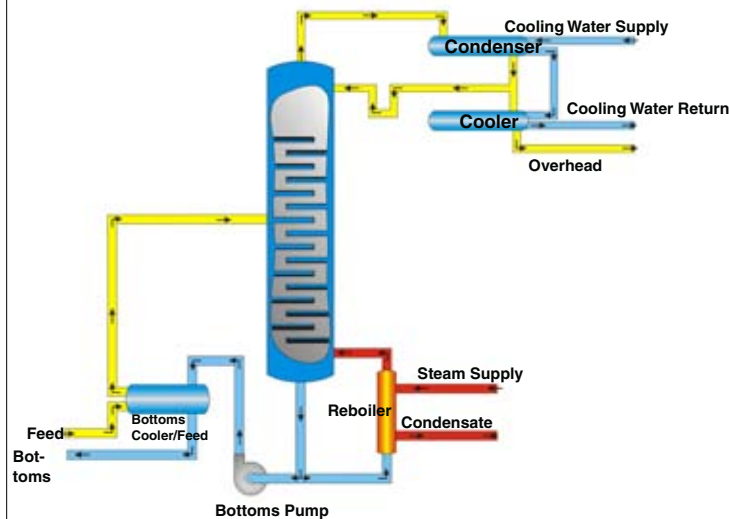
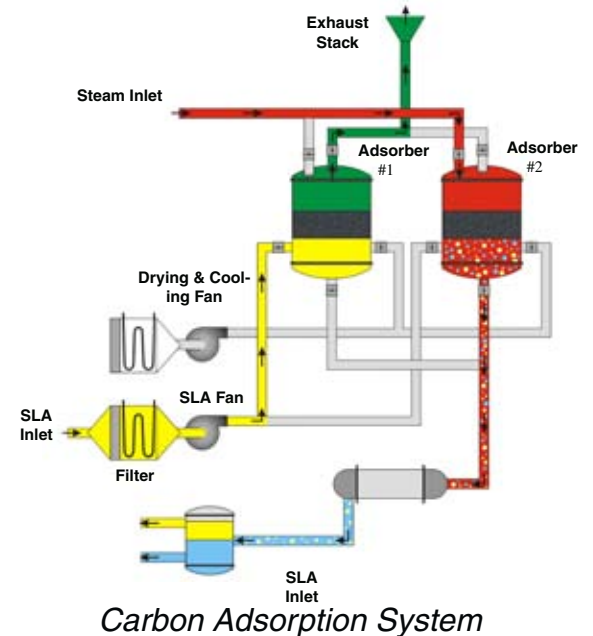
### Japan

**MEGTEC Systems, Inc.**  
Telephone: +81-78-783-0161

### Australia

**MEGTEC Systems Australia, Inc.**  
Telephone: +61-3-9574-7450

**www.megtec.com**  
August 2007



Distillation System

## Unparalleled Experience in Solvent Recovery

MEGTEC's Solvent Recovery Division's experience in building Solvent Recovery Systems and its family tree dates all the way back to the years following the First World War. As such, we offer unparalleled experience to the industry. Familiar names in the family tree are companies such as Sutcliffe Speakman, Croftshaw, Barneby Cheney, and Vara International, representing hundreds of operating systems.