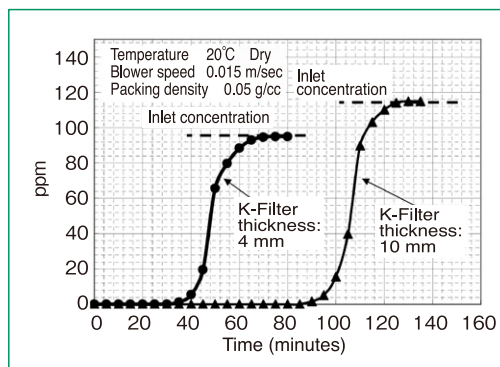


Feature

- **Superior treatment capacity:** Reduces outlet concentrations and achieves high recovery rate with a high removal rate of at least 95%.
- **High quality of recovered liquid/treated gas:** Uses a high-quality (high-purity, low catalytic effect) "K-Filter."
- **Environment-friendly:** Fewer CO₂ emissions than combustion treatment systems and re-usable recovery solvent.



Toluene breakthrough curve

Overview

(Technical principles, actions, etc.)

This is the VOC Adsorption Recovery System (KF System) that uses the activated carbon fiber "K-Filter," which Toyobo was the first in the world to commercialize. Made in the form of fibers several tens of microns in diameter, the "K-Filter" has a surface area about 200 times larger than granular activated carbon, so it has a remarkable adsorption/desorption speed, high purity, and low catalytic effect; in short, it is an activated carbon filter capable of high-efficiency removal and high-quality recovery. To maximize these features, the KF System has the system configuration shown by the flowsheet in Figure 1.

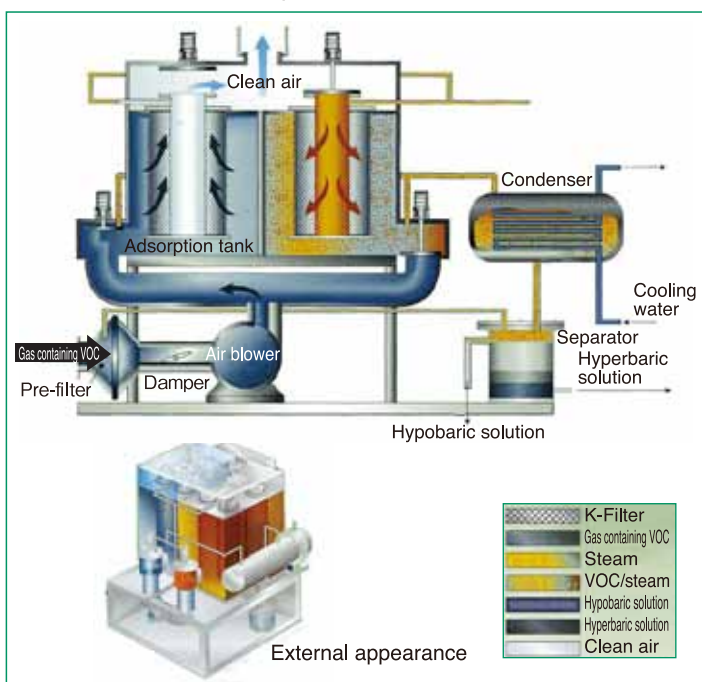
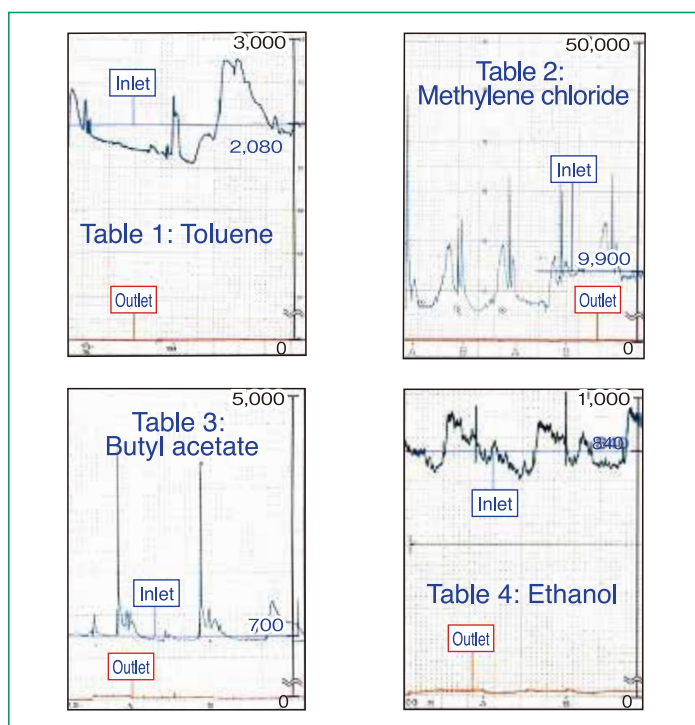


Figure 1 KF System Flow

Using a blower, gas containing VOC is forced through the "K-Filter" element (a cylinder about 200mm in thickness wrapped around the filter) inside an independent adsorption tank, and at least 95% of the VOC are removed (adsorbed into the element). The adsorption tanks are switched over (in approximately 10-minute cycles) before the VOC breakthrough point is reached to obtain a continuous adsorption treatment. Water vapor is blown into the element that adsorbed the VOC, desorbing the VOC and renewing the element for the next VOC adsorption cycle. The desorbed VOC, along with the water vapor, are cooled by cooling water in the condenser and then recovered and left at rest in the separator, where they are separated into VOC and water. In the case of non-water-soluble VOC, the system is capable of high-efficiency recovery and the solvent can even be re-used. In the case of water-soluble VOC, the solvent can be re-used by applying a treatment such as distillation.



Treatment data

Introductory Track Record

- Delivered more than 1500 systems in Japan.
- Delivered more than 30 systems to China, Taiwan, South Korea and Thailand in past 5 years.
- Toyobo is an expert in methylene chloride recovery in the polycarbonate production process.

Effects

Type of business	Substance	Air volume m ³ /min	Concentration ppm (CH ₄)	Discharge concentration ppm (CH ₄)	Removal rate (%)	Remarks
Film laminate	Ethyl acetate	300	1,000	30	97.0	
Pharmaceutical	Methylene chloride	20	9,900	16	99.8	Table 2
	Toluene	40	2,080	2	99.9	Table 1
Chemical	Benzene	60	2,760	6	99.8	
	Styrene monomer	480	100	1	99.0	
Semiconductors/ liquid crystal	IPA, MEA	280	60	1	98.4	
	Butyl acetate	60	700	5	99.3	Table 3
Food/fermentation	Ethanol	50	840	10	99.8	Table 4