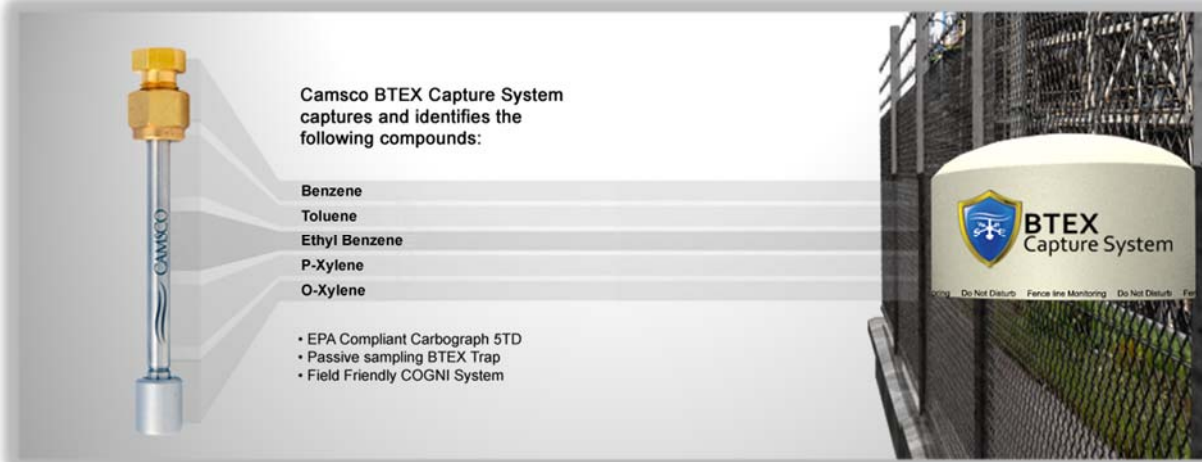




BTEX Capture System for Fenceline Monitoring

Introduction



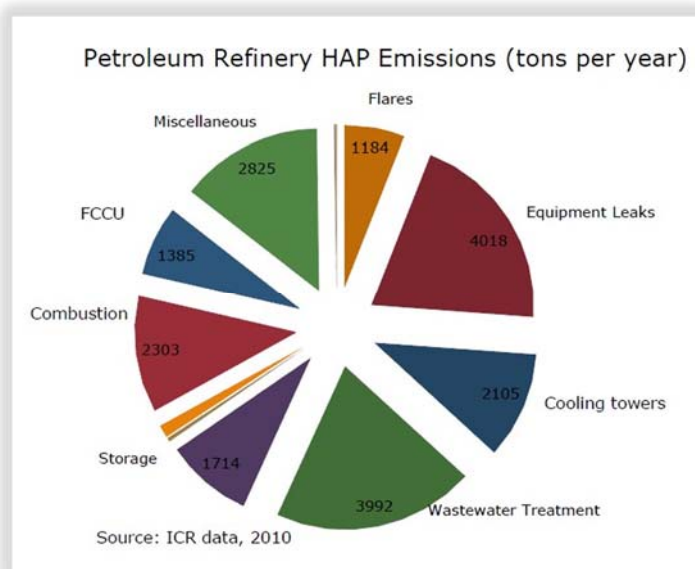
Camsco BTEX Capture System captures and identifies the following compounds:

- Benzene
- Toluene
- Ethyl Benzene
- P-Xylene
- O-Xylene

- EPA Compliant Carbograph 5TD
- Passive sampling BTEX Trap
- Field Friendly COGNI System

Camsco's BTEX Capture System is our solution to the US EPA's ongoing effort to improve the monitoring of VOC emissions from refineries.

Petroleum refineries are a major source of air pollution in the US, releasing large amounts of toxic pollution that pose a serious public health risk to nearby communities and the environment. Each one of the ~140 operating refineries contains hundreds of emission points for Hazardous Air Pollutants (HAP) including Volatile Organic Compounds (VOC), and presents challenges to a universal monitoring solution which handles the vast variation in operation, size, climate, and plant design.



The EPA relies heavily on the use of emissions factors to develop regional and national emissions inventories and make critical air quality management decisions related to petroleum refineries. However, this approach has been questioned by the EPA's own scientific studies, which show that actual emissions of HAP and VOC from petroleum refineries can be 100 times greater than reported emissions. In 2008, the City of Houston filed a petition under the Data Quality Act challenging the EPA's use of emission factors related to refineries because they are inaccurate, unreliable, and biased.



Figure 1, Camsco's BTEX Capture System at work

In response to the petition, the EPA initiated a series of studies to improve its air monitoring protocol for refineries. The studies have employed various monitoring technologies such as passive sampling sorbent tubes and remote sensors, and have been carried out at various locations such as the ship channel near Houston Texas, and a growing number of refineries.

Air monitoring at the property boundary/fenceline can provide a direct measure of the time-averaged concentrations of the VOC emission, and sorbent tubes as passive air samplers have been well established for BTEX, four index compounds for the evaluation of petroleum-related VOC emissions.

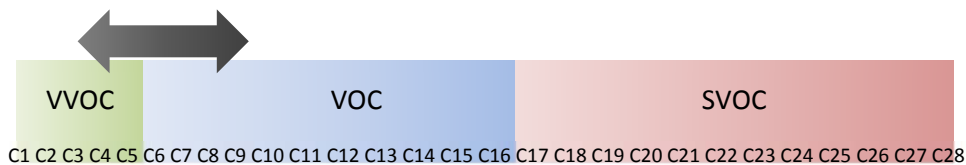
Camsco's BTEX Capture System addresses many fundamental problems related to fenceline monitoring, and provides a solution that is scientifically sound, environmentally friendly, easy to implement, and cost-effective. A few highlights of the system:

- A passive sampling process that involves no electronics, no human attendance and no downtime
- Easy to setup and detach, portable, and requires only minimum training to operate
- Weatherproof shelter and bug/dust proof passive sampling caps
- Error-proof identification: high quality sorbent tubes with unique COGNI system
- Flexible, continuous sampling duration from days to weeks
- Sampling cost down to single-digit US dollars per collection, thanks to reusable media
- Adequate number of third-party laboratories capable of doing the analysis once sample is collected

BTEX Capture System configuration

- Fenceline mountable tube shelter with metal fixtures (CAMSCO Part Number **BTEX-S**)
- BTEX Monitoring tubes with Carbograph™ 5TD, Brass Compression Caps and 1 Passive Sampling Cap. (CAMSCO Part Number **BTEX-T**)
- Brass compression caps and aluminum passive sampling caps. (CAMSCO part number **B60F** and **DC60** respectively)
- Carbograph™ 5TD is equivalent to Carbopack™ X

Volatility Range C3~C8



The BTEX Capture system has a C3 ~ C8 volatility range specific to BTEX (C6 ~ C8) monitoring. It also captures 1, 3-butadiene (C4), another air pollutant and potent carcinogen from refineries.

Temperatures

System Sampling Temperature:	-30°C ~ 50°C
Tube Maximum Temperature:	400°C
Tube Conditioning Temperature:	350°C
Tube Desorption Temperature:	325°C ~ 350°C

- Camsco's BTEX Capture System is specifically designed for fenceline monitoring of BTEX and 1,3-butadiene near refineries.
- Monitoring locations (red dots in Figure 2) are selected around the refinery (light blue square) to average out the wind effect. Depending on the size/shape of the refinery, typical distributions are: 40 Degree (9 sampling locations), 22.5 Degree (16 sampling locations) and 15 Degree (24 sampling locations). Additional monitoring locations can be added at specific points of interest, such as the oil/gas loading/unloading zone.

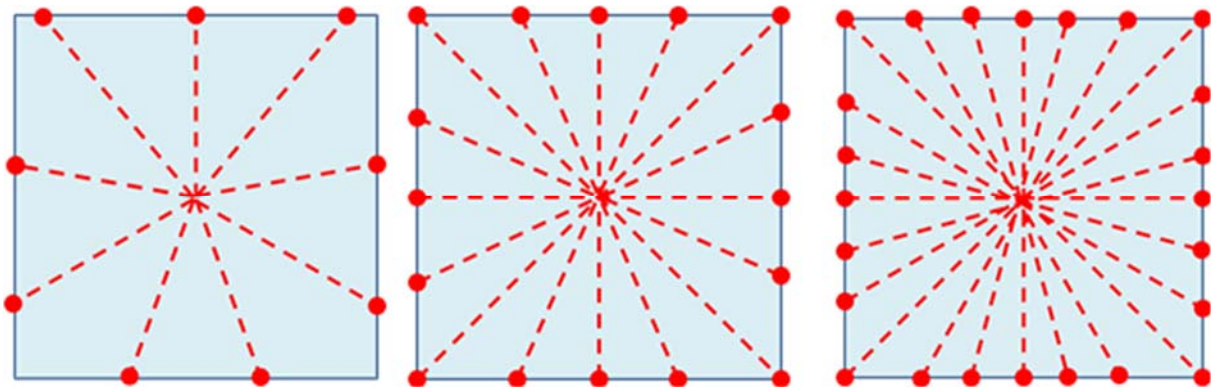


Figure 2. Monitoring locations on fenceline surrounding a square refinery, 40°, 22.5°, and 15° distributions from left to right

Technical Guide



- The tube shelter protects the tube(s) from sun and rain (Figure 3).
- Tube/shelter assembly is normally hung at 5 feet high from ground, which is about the nose height for a standing person
- Sampling starts when one of the compression caps is replaced by a passive sampling cap, which protects the tube from bugs, dust and turbulences.
- Sampling is finished when the compression caps are put back onto the tube and properly tightened.
- Sampling time is normally 1~2 week, which averages out daily fluctuations, operational/shift differences, and night/day temperature differences



Figure 3, Camsco's BTEX Monitoring Tube inside the Tube Shelter

Contact Camsco for more information on how the BTEX Capture System works

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