

The logo for ENVIROGEN features a cluster of blue dots of varying sizes arranged in a roughly circular pattern, with the word "ENVIROGEN" in a clean, sans-serif font positioned to the left of the dots.

ENVIROGEN

The background is a white page with large, overlapping, curved blue shapes in various shades of blue. There are also faint, concentric blue circles in the bottom left and bottom right corners.

BIOFILTER TECHNOLOGY
SYSTEMS OVERVIEW
**MANAGING INDUSTRIAL &
MUNICIPAL EMISSIONS**

ADVANCED BIOFILTER TECHNOLOGY FOR PROVEN PERFORMANCE

LOW LIFECYCLE COSTS FOR VOC & ODOR CONTROL

Envirogen's biofilter technology systems safely destroy volatile organic compounds (VOCs), hazardous air pollutants (HAPs) and odor-causing chemicals. These systems provide an attractive alternative to standard thermal, chemical, and adsorptive processes to treat air pollutants safely, reliably and cost effectively, with low capital and operating costs.

Our state-of-the-art portfolio includes biofilters, biotrickling filters and combinations of the two technologies – in both standardized and custom designs. Envirogen can provide solutions for a broad range of contaminants and flow rates from 120 to over 100,000 cfm.

MANAGING INDUSTRIAL & MUNICIPAL EMISSIONS

Envirogen biofilters are the result of more than three decades of experience in managing industrial and municipal emissions, featuring advanced engineering concepts that can be tailored to provide a low lifecycle cost solution in your facility.

Biofilters use naturally occurring microorganisms to treat air containing hydrogen sulfide (H₂S) compounds, VOCs and other odorous substances. Foul air is collected and sent to the biofilter where microorganisms metabolize the target contaminants to clean the air stream.

Our advanced technology is ideally suited for contaminants that are low molecular weight, polar and readily biodegradable. They systems are particularly effective for low loading applications at high flow volumes. You can achieve removal ratios more than 95% for water soluble compounds and 90% for BTEX and similar compounds. Furthermore, biofilters are extremely effective in treating odors caused by H₂S and other reduced sulfur compounds. Removal efficiency greater than 99+% H₂S and >90+% odor removal is common.

Envirogen biological vapor phase treatment systems are:

- Proven technology with over 130 biofilter systems installed in over 90 locations
- Cost effective with low operating costs and minimal maintenance
- Highly efficient at removing broad range of contaminants
- Compatible with other treatment technologies for multi-zonal treatment
- Adaptable for different influent air and loading rates (broad range of configurations)

As stand-alone systems or in combination with other emissions control technologies, we offer an inherently sustainable solution with ease of operation and very low operating costs.

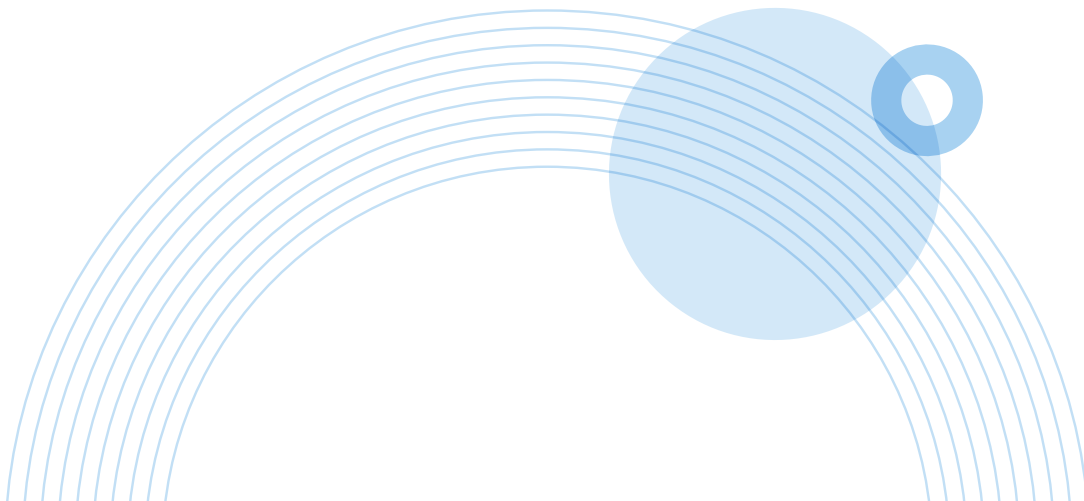
BIOFILTER SYSTEMS

Envirogen's advanced systems are suited to managing a range of industrial and municipal applications:

- Asphalt manufacture
- Chemical processing
- Coatings manufacture
- Composting
- Food processing
- Fragrance manufacture
- Landfill gas/leachate extraction
- Petroleum and refining
- Pulp and paper manufacture
- Rendering
- Wastewater collection and pumping
- Wastewater treatment
- Wood products

SUMMARY OF SYSTEMS:

SERIES/LINE	MODELS	MEDIA (ft ³)	CUBIC FEET PER MIN (CFM)	EBRT/SECONDS (DEFAULT)
Modular Biofilter (H)	8	120-680	120-2720	10-60 (30)
Modular Biofilter (I)	13	450-3900	224-8350	30-120 (75)
Modular Biofilter (P&B)	14	448-4176	450-1670	15-60 (30)
Biotrickling Filters (BT)	30	120-3500	200-14000	10-30 (15)
Integrated Biotrickling & Biofilter (BTBF)	11	550-4500	800-9000	30-55 (40)
Built-in-Place (BIP)	24	2000-48000	2000-72000	20-60 (30)



TAILORED SOLUTIONS FOR YOUR FACILITY



MODULAR BIOFILTERS (H/I/P/B)

For lower air flow rates and sites requiring a smaller system footprint, Envirogen modular biofilters deliver reliable, cost-effective performance. These engineered prefabricated fiberglass systems come in a range of standard configurations and can be adapted to flow and loading requirements. Some can be shipped with all media pre-installed, or the media is easily installed at the site. Our modular industrial biofilters (H, I series) can handle from 100 to 8,350 cfm air flows based on size and loading. The I-series modular biofilters feature internal humidification and irrigation systems. The P&B series are box biofilters without pre-humidification.



BIOTRICKLING FILTERS (BT)

Envirogen biotrickling filters are vertically-oriented vessels filled with an inorganic media featuring 100% water recirculation. Their unique design can address high concentration of H₂S odor control in areas where space is at a premium - offering a shorter retention time and higher throughput than a conventional biofilter. They can also treat high concentrations of VOCs and be chemically augmented when needed. The recirculation water maintained in the tower allows for optimal control of pH, nutrient levels and biofilm thickness. In some applications, an intermittent, single-pass irrigation system can be supplied, eliminating the need for a recirculation pump.



INTEGRATED BIOTRICKLING AND BIOFILTER SYSTEMS (BTBF)

The result of 25 years of research, design and operating experience, Envirogen's biotrickling filter designs and integrated biofilter technology systems are some of the most technically advanced solutions for low- to moderate-flow applications available. These systems combine the high performance of a biotrickling filter in removing H₂S, with the VOC and reduced sulfur compound efficiencies of a biofilter in a single, prefabricated fiberglass system that offers ease of installation and a small system footprint. One of the design advantages of the integrated Biotrickling and biofilter system is that it can be configured to offer multiple zones of treatment – for efficient and cost-effective management of complex air streams.



BUILT-IN-PLACE BIOFILTERS (BIP)

Envirogen built-in-place systems are custom made biofilter technology systems designed for mid- to high-air flow VOC and odor control applications. Installations are based on standardized multi-bay designs and system components to lower installed costs for air flows ranging from 1,000 to 72,000 cfm or more. They can be configured with both biofilter and biotrickling designs for multi-zonal treatment. Envirogen built-in-place biofilters are intended for centralized treatment solutions and are ideal for emissions control in industrial manufacturing applications.

LONG-LIFE FILTER MEDIA WITH 10-YEAR WARRANTY

The Envirogen biofilter product line features a set of long-life engineered filter media matched to your project. With filter media guaranteed for up to 10-years it helps ensure lower project life cycle costs, consistent compliance, and excellent system performance:

- ScorFil™ inorganic, scoria lava
- VamFil™ aged bark, engineered
- FlexFil™ synthetic structural or random packed media
- NutraFil™ nutrient impregnated inorganic media
- Other filter media available

SUSTAINABLE EMISSIONS CONTROL

For a broad range of industrial emissions applications, the Envirogen Sustainable Emissions Control offering features the use of both biological and enhanced adsorption treatment technologies to control contaminants covered under the Clean Air Act and state and local air quality regulatory programs. Used alone or together, the two-technology approach allows Envirogen to treat organic and inorganic, polar and non-polar emission constituents at varying concentrations and air flow rates.

Our biological and adsorbent technologies for emissions control are sustainable because they are safe and high performing. They offer the ability to reduce chemical and energy consumption, the opportunity for recycle/re-use and to lower carbon footprint compared with other treatment technologies. They are sustainable in another sense due to their low operating costs – with the ability to deliver significant savings over the lifecycle of a project. Ask your Envirogen representative for more details.



ABOUT ENVIROGEN

Envirogen is a leading international provider of water and wastewater treatment solutions. We solve complex challenges relating to water availability and quality, and help our customers to increase productivity, reduce costs and meet environmental and sustainability targets.

We do this through offering:

- Best in class water and wastewater treatment and process filtration technology
- Expertise in design, project management and engineering
- World class manufacturing and servicing capability



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