

Hungerford & Terry

PFAS Treatment Systems



**Recognized Internationally,
Engineered to Last a Lifetime**

...For Per- and Polyfluoroalkyl Substances Found in Drinking Water

About PFAS: Per- and Polyfluoroalkyl Substances

The Challenge

Once lauded as miracles of modern science, Per- and Polyfluoroalkyl substances were widely used in the manufacture of everyday consumer goods and products such as food packaging, adhesives, cosmetics, non-stain fabric coating firefighting foams, and many others. Unfortunately, these chemicals have been linked to health concerns such as reproductive and developmental side effects; low infant birth weights; bladder, prostate, liver, and thyroid cancers; restricted liver and kidney functions; and thyroid hormone disruption (from PFOS) when found in drinking water.

The Solution

Fortunately, there are two treatment processes that have been developed to reduce these contaminants to acceptable limits in drinking water. These processes are known as GAC (Granular Activated Carbon) or Selective Ion Exchange Resin, both of which are incorporated into pressure vessel system designs. Hungerford & Terry can provide both technologies depending on the species of PFAS, water quality analysis, and competing constituents found in the raw water.

Two complete PFAS Treatment Systems from the Industry Leader still setting the standards for water treatment worldwide

The Treatment Processes

Hungerford & Terry is focused on providing the most cost-effective and efficient treatment system designs using either GAC (Granulated Activated Carbon) or Selective Ion Exchange processes based on water quality data at the raw water source.

With GAC, the water quality and background organics, including TOC, must be considered since Carbon is not selective to other constituents in the raw water. Background organics compete for adsorption against PFAS by “blinding off” smaller pores in the media.

With Selective Ion Exchange Resin, advantages in performance and operation can be had through addressing both the long and short chain molecules of PFAS. However, the resin does have a higher initial per-cu/ft cost. Pretreatment with a 5-10 micron bag filter is recommended as it removes the need for backwashing.

The System Design

In both GAC and Selective Ion Exchange Resin Processes, rather than a single vessel design, the typical system configuration is a “Lead-Lag” piping arrangement that allows for:

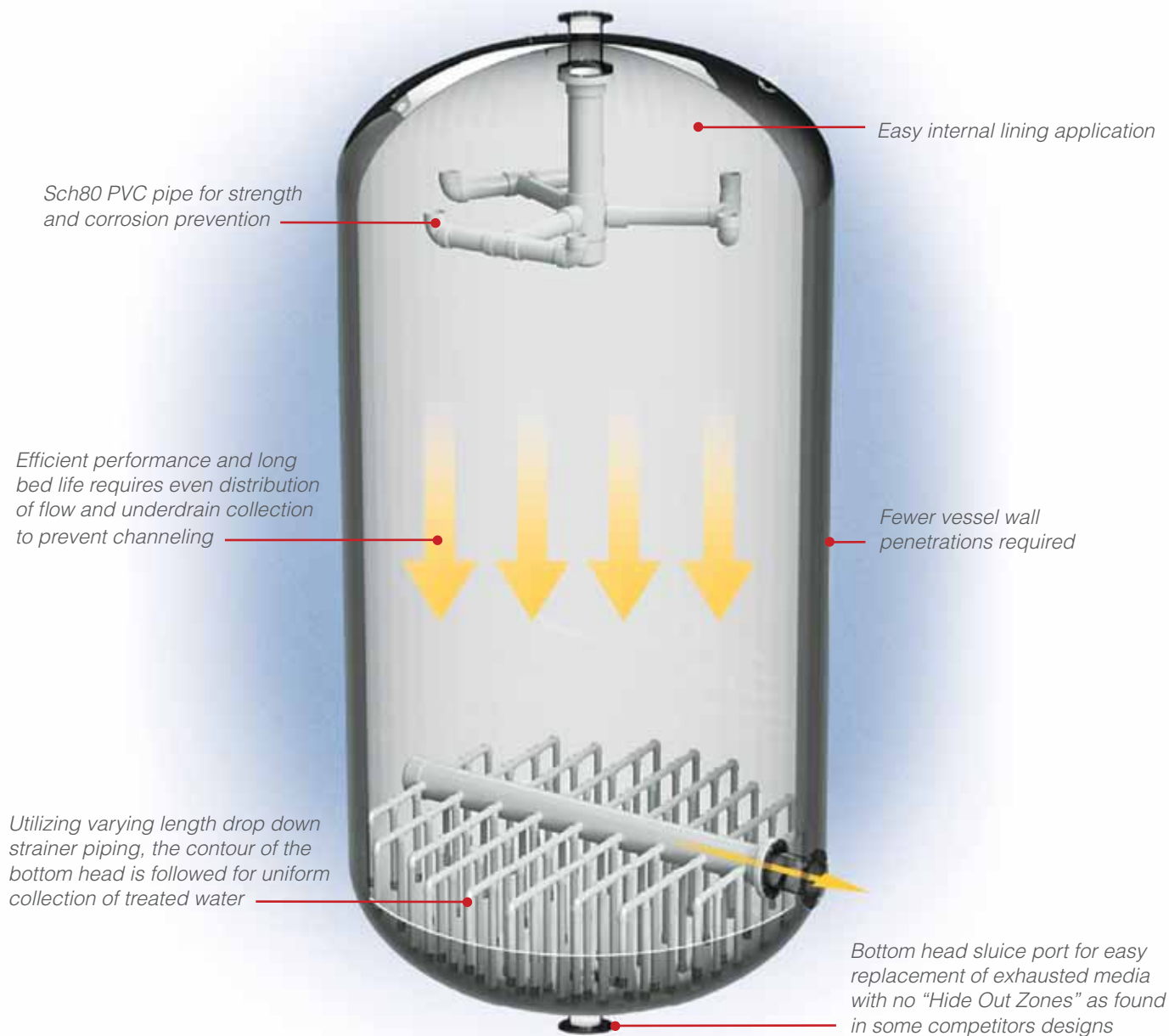
- Longer runtime and higher efficiency
- 25-50-75% bed depth sample taps for analysis of the Mass Transfer Zone

With more than 113 years of experience in custom water treatment system design, H&T engineers can meet any specific piping arrangements required by the client. Manually operated or PLC controlled designs are also available.



Comparison	GAC	Ion Exchange
EBCT	10 -15 min.	1.5 - 3 min.
Bed Depth	7 -12 ft.	3 -5 ft.
Vessel Design	- Larger Diameter - Taller for longer EBCT	- Smaller Diameter - Shorter due to lower EBCT
Media Cu/Ft Cost	Lower cost but requires more	Higher cost but requires less
System Footprint	Typically larger due to higher EBCT	Typically smaller due to lower EBCT
Effluent Goals	Limited capacity for reducing short-chain PFAS to ND	- Higher capacity for reducing short & long-chain PFAS to ND - Limited capacity for short-chain carboxylates like PFBA

The H&T Difference – A Superior Uniform Distribution System



Hungerford & Terry, Inc.

A Leader in Providing Application-Specific Water Treatment Solutions

For more than 100 years, H&T has met the challenge of new regulations with a vast array of water treatment solutions.

H&T advanced water treatment solutions include systems that remove iron, manganese, hydrogen sulfide, arsenic, radium, nitrate, sodium, perchlorate, hardness, color,

PFAS/PFOS and other contaminants for municipal, industrial, and government facilities worldwide.

Hungerford & Terry, Inc. also designs and manufactures complete demineralizer systems, forced draft and vacuum degasifiers, condensate polishers, and specialized treatment systems.



226 N. Atlantic Avenue • PO Box 650 • Clayton, NJ 08312-0650

P: 856-881-3200 • F: 856-881-6859 • sales@hungerfordterry.com • www.hungerfordterry.com