

A person wearing a white lab coat is holding a clear glass filled with water. The background is blurred, showing more of the lab coat and a white surface.

PFAS Contamination in Water and its Removal with RO Filtration.

Addressing the Global Threat with
Effective Filtration.

 **Puricom**[®]



*Member,
Water Quality
Association*

Introduction

- Per- and Polyfluoroalkyl Substances (PFAS) are synthetic chemicals resistant to heat, water, and oil.
- PFAS contamination poses a global threat to water sources, prompting a focus on effective solutions like Reverse Osmosis Filtration.

What are PFAS?

PFAS are a group of human-made chemicals with strong carbon-fluorine bonds, known for their resistance to environmental factors.

These chemicals have been widely used in everyday products such as non-stick cookware, waterproof clothing, and cleaning products, leading to their presence in drinking water supplies.



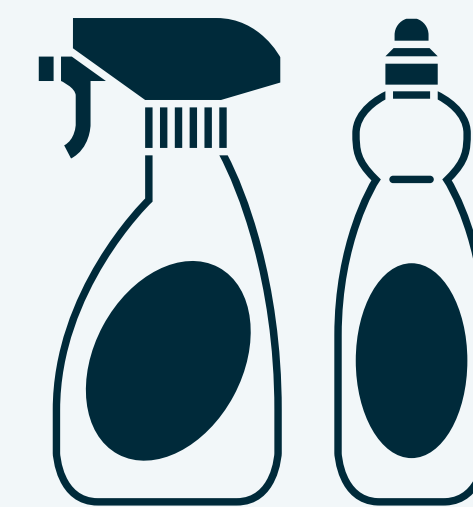
Takeout
containers



Waterproof
apparel



Nonstick
cookware



Cleaning
products

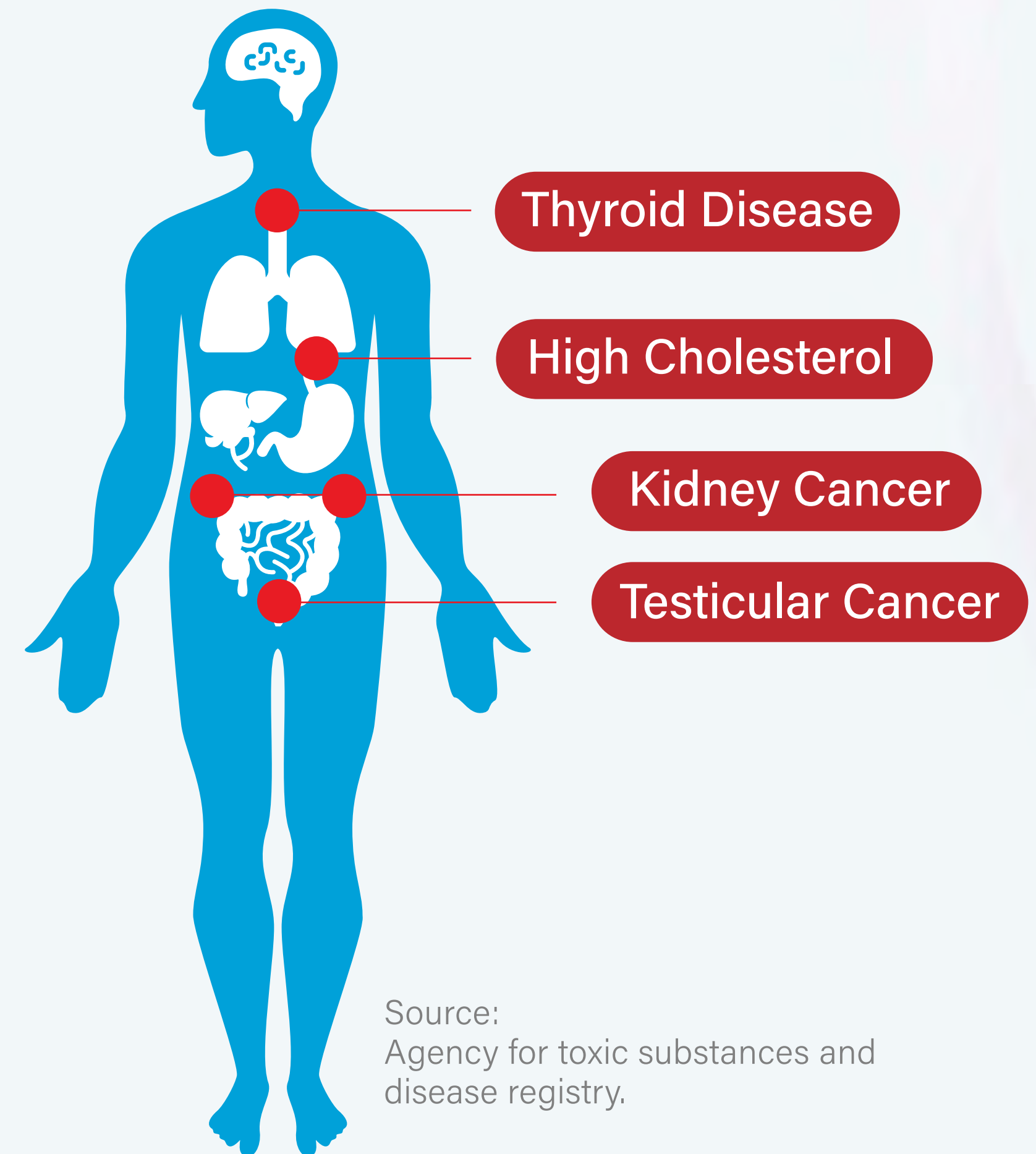


Waterproof
coating

Potential Health Risks:

The PFAS family comprises nearly 15,000 chemicals, with smaller ones like PFOA and PFOS being more easily absorbed by the environment and the human body.

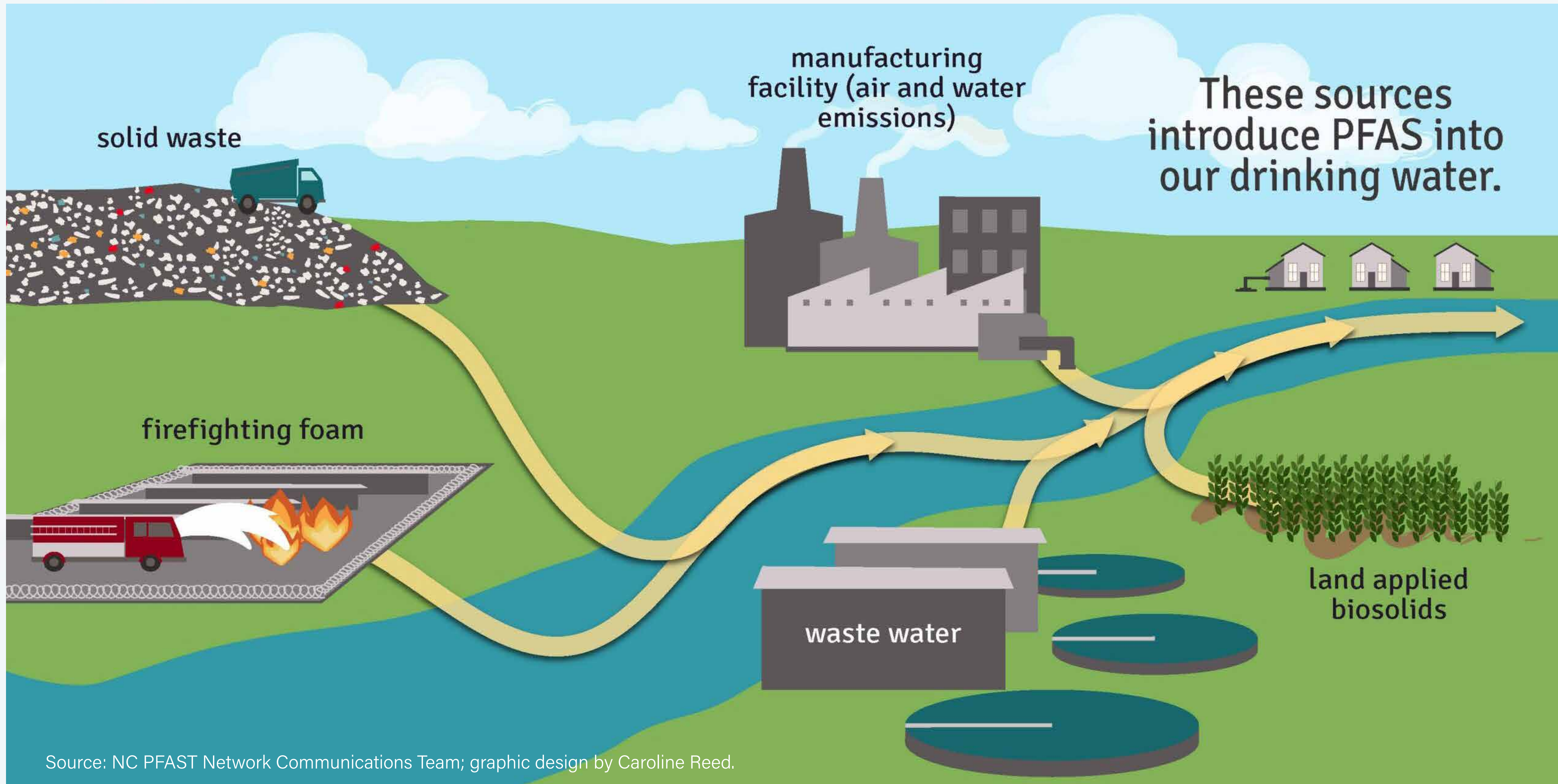
PFAS' persistent nature raises concerns about potential health risks, including cancer, reproductive issues, and disruption of immune and endocrine systems.



PFAS in Water Sources

PFAS can enter water sources through industrial discharges from manufacturing plants, improper disposal practices at chemical facilities, and the use of firefighting foam.

Firefighting foam, particularly aqueous film-forming foam (AFFF), is a significant source of PFAS contamination, especially at airports and military bases.



Source: NC PFAST Network Communications Team; graphic design by Caroline Reed.

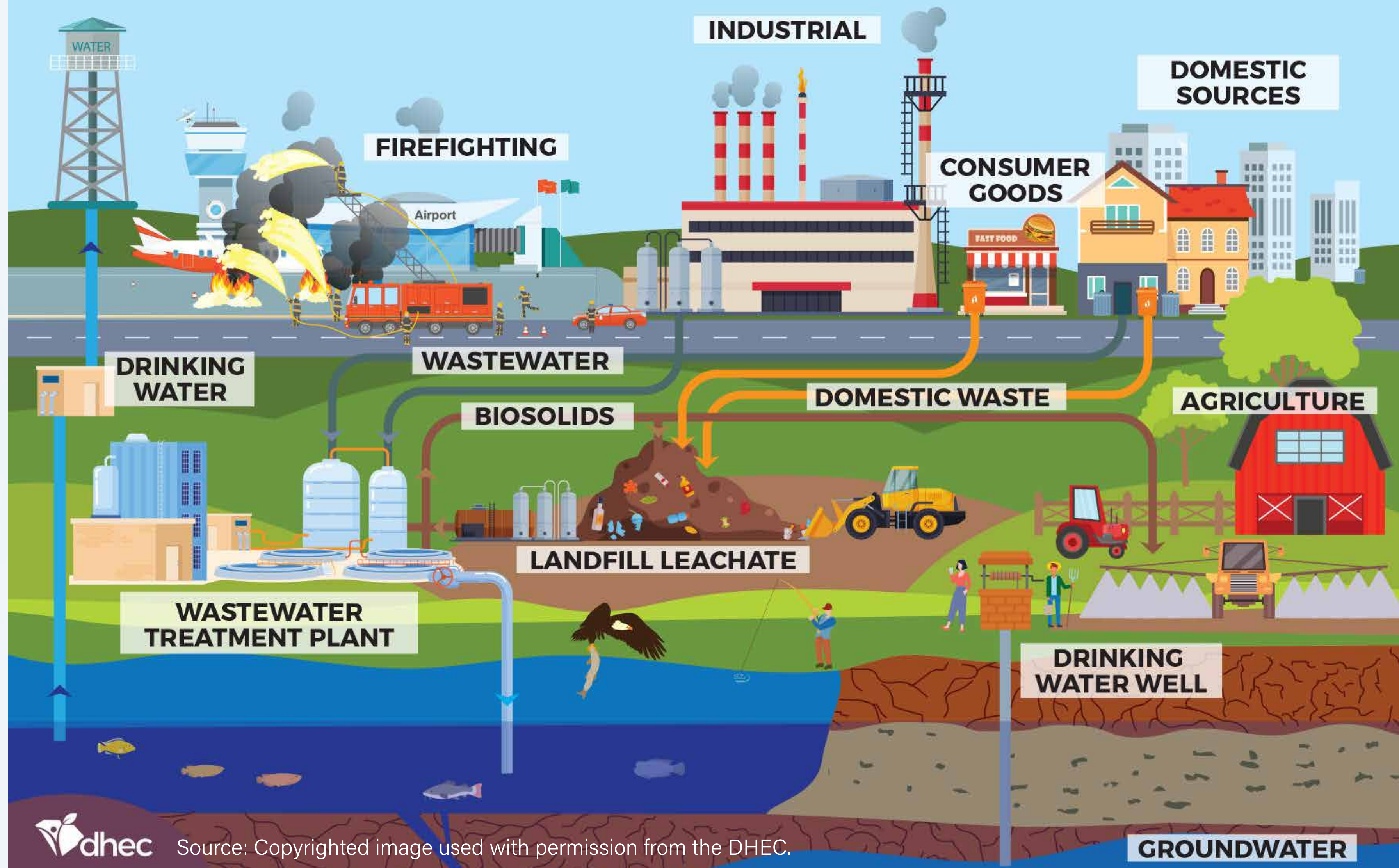
The Scope of PFAS Contamination:

PFAS contamination extends globally, affecting both urban and rural drinking water supplies.

Many public water systems report elevated PFAS levels, leading to concerns about the safety of tap water.

Environmental impacts include the accumulation of PFAS in surface water bodies, soil, and sediment.

PFAS SOURCES IN THE ENVIRONMENT



Source: Copyrighted image used with permission from the DHEC.

GROUNDWATER



PFAS Regulations in Drinking Water (US)

The United States Environmental Protection Agency (EPA) has set a non-enforceable lifetime health advisory (HA) level for PFOS and PFOA at 70 parts per trillion (ppt) in drinking water.

The EPA recommends monitoring PFAS levels and provides guidance on reporting results to regulatory authorities.



PFAS Regulations in Drinking Water (EU)

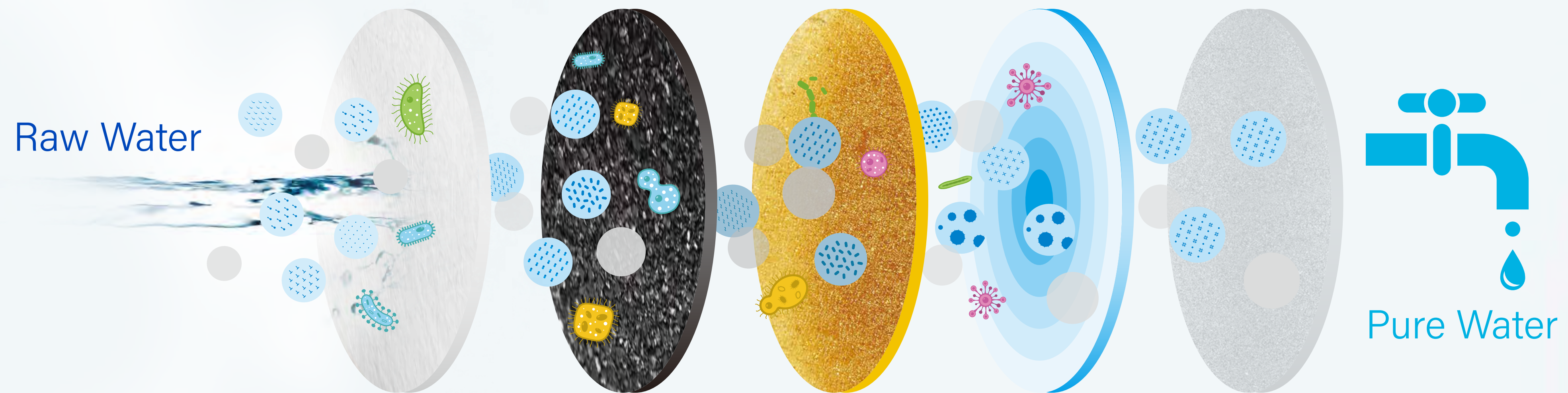
The European Union (EU) has established regulatory limits for PFAS in drinking water through its Drinking Water Directive.

Member states are required to monitor and control PFAS levels in their water supplies, emphasizing a proactive approach to ensuring water safety.

Ensuring Safe Water through Effective Filtration

PFAS' solubility in water poses a challenge to traditional treatment methods.

Various filtration technologies, including activated carbon, ion exchange, and reverse osmosis, are explored as effective solutions.





Activated Carbon Treatment

Activated carbon, due to its highly porous nature, is effective in adsorbing PFAS in drinking water treatment systems.

The EPA rates carbon filtration as 88-99% effective at treating certain PFAS, making it a widely used method for PFAS removal.



Ion Exchange Treatment

Ion exchange resins, consisting of highly porous, polymeric material, attract negatively charged PFAS ions.

While ion exchange is highly effective in removing PFAS, it is typically more expensive than activated carbon treatment and has limitations based on resin choice and duration of effectiveness.

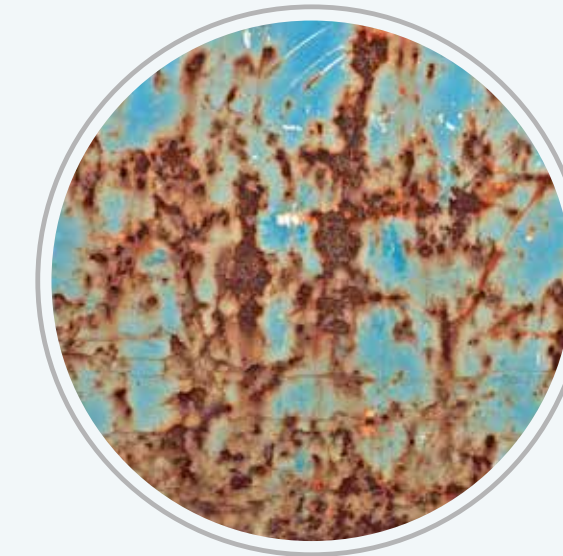
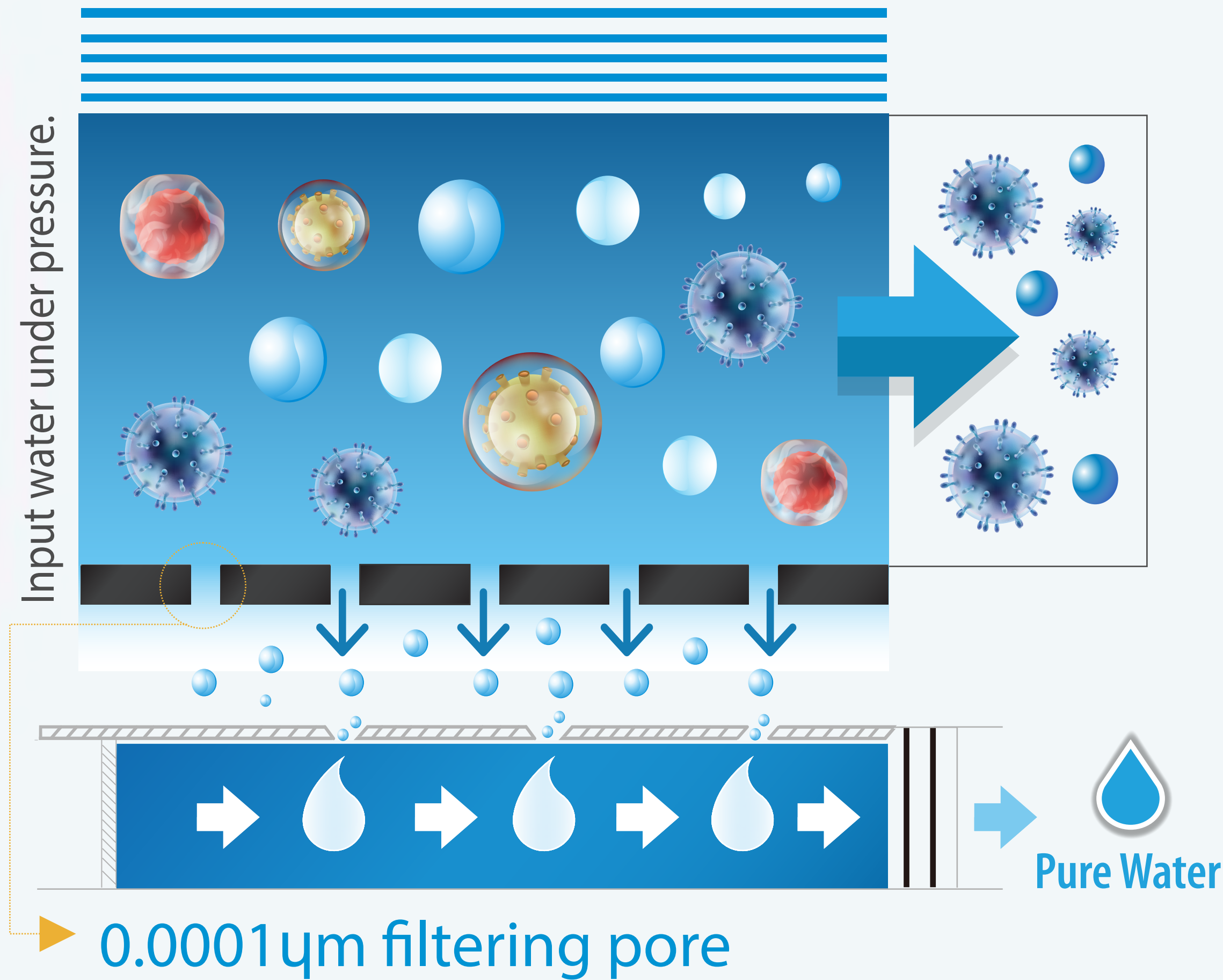
Reverse Osmosis Filtration

RO separation, according to the EPA, is up to 99% effective at removing certain PFAS.

Unlike activated carbon or ion exchange, RO is not limited in its filtration capacity. Residential RO systems, employed at the point of use, offer a practical and versatile solution for daily filtration of drinking water, providing a highly economical and effective approach to PFAS removal.

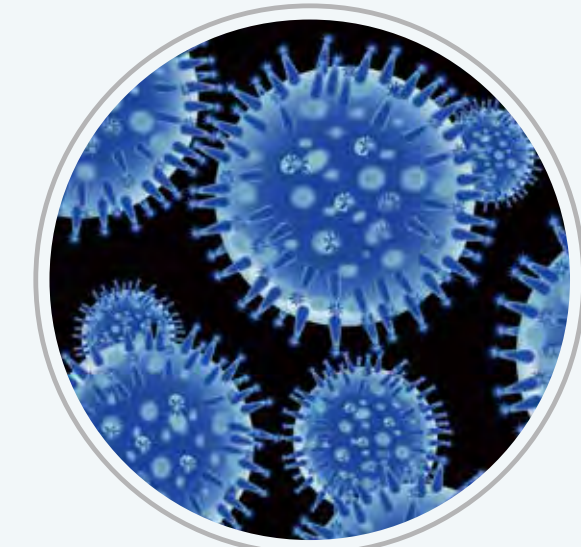


Reverse Osmosis Filtration



Heavy Metal

Arsenic, cobalt, cadmium, mercury, lead... etc.



Virus

Epidemic virus, enterovirus, viral virus... etc.



Bacterial

Spirulina, bacillary dysentery, Escherichia coli... etc.



Chemical Toxicant

Air pollution, pesticide... etc.



Introduction of membrane pore and what it filter:

