



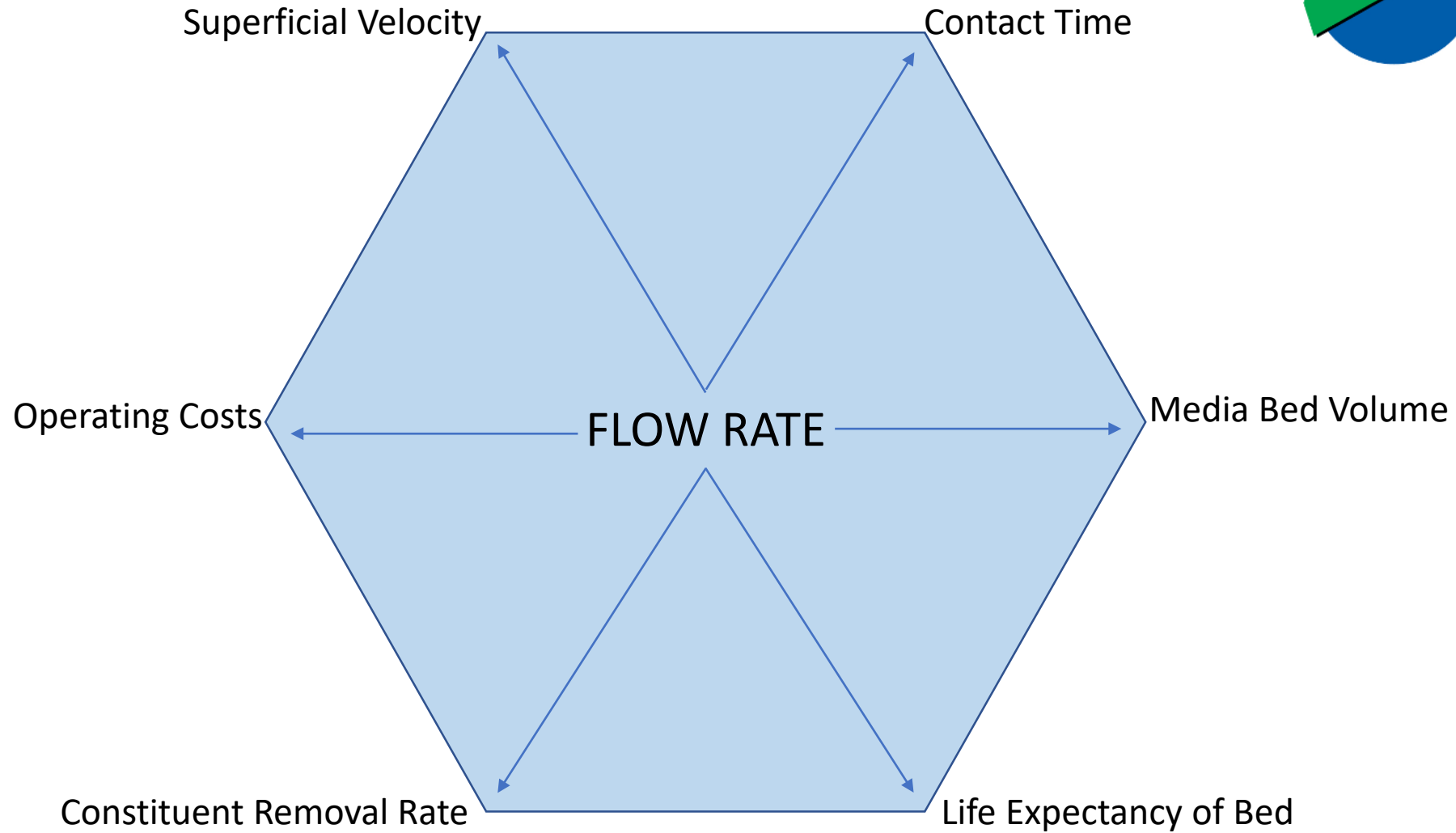
ASDWA Webinar October 17, 2018

Introduction

- TIGG has designed and built systems to purify vapors and liquids for over 40 years
- Headquarters in Oakdale, PA with manufacturing in Heber Springs, AR
- Product mix includes systems for use in the municipal and industrial markets
- Ability to incorporate various types of media into our systems
- Available systems sizes from 55 gallon drums to 14 foot diameter vessels
- Provide solutions with system sales or lease options
- Larger systems are certified by NSF to NSF 61 Requirements

Today's Discussion Topics

- Media Selection
 - Flow Rate
 - Water Quality
 - Surface or Ground Water
- Mass Transfer Zone
- Economic Use of Media
- Pilot Studies



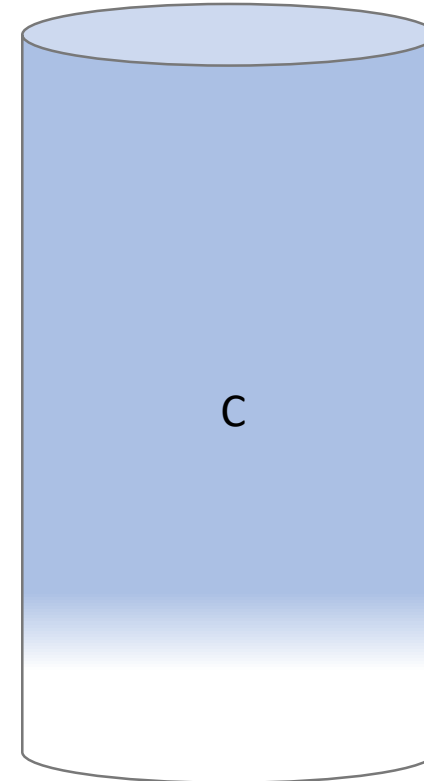
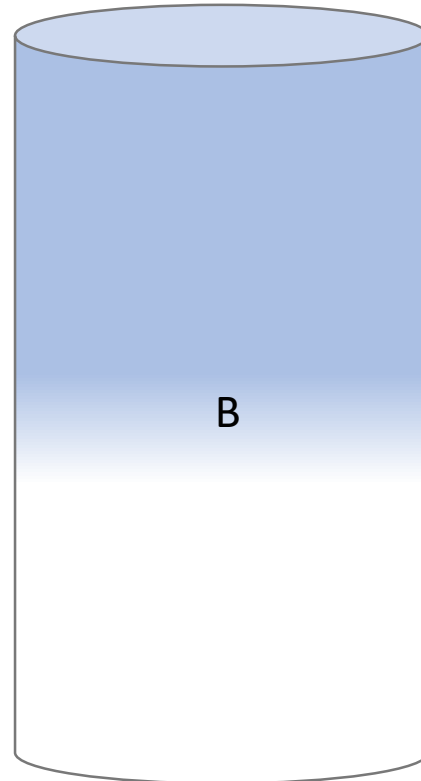
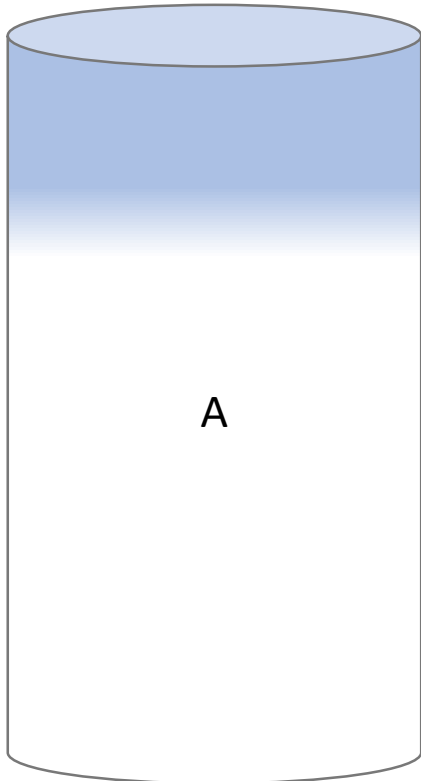
Water quality information is essential in providing the correct solution!

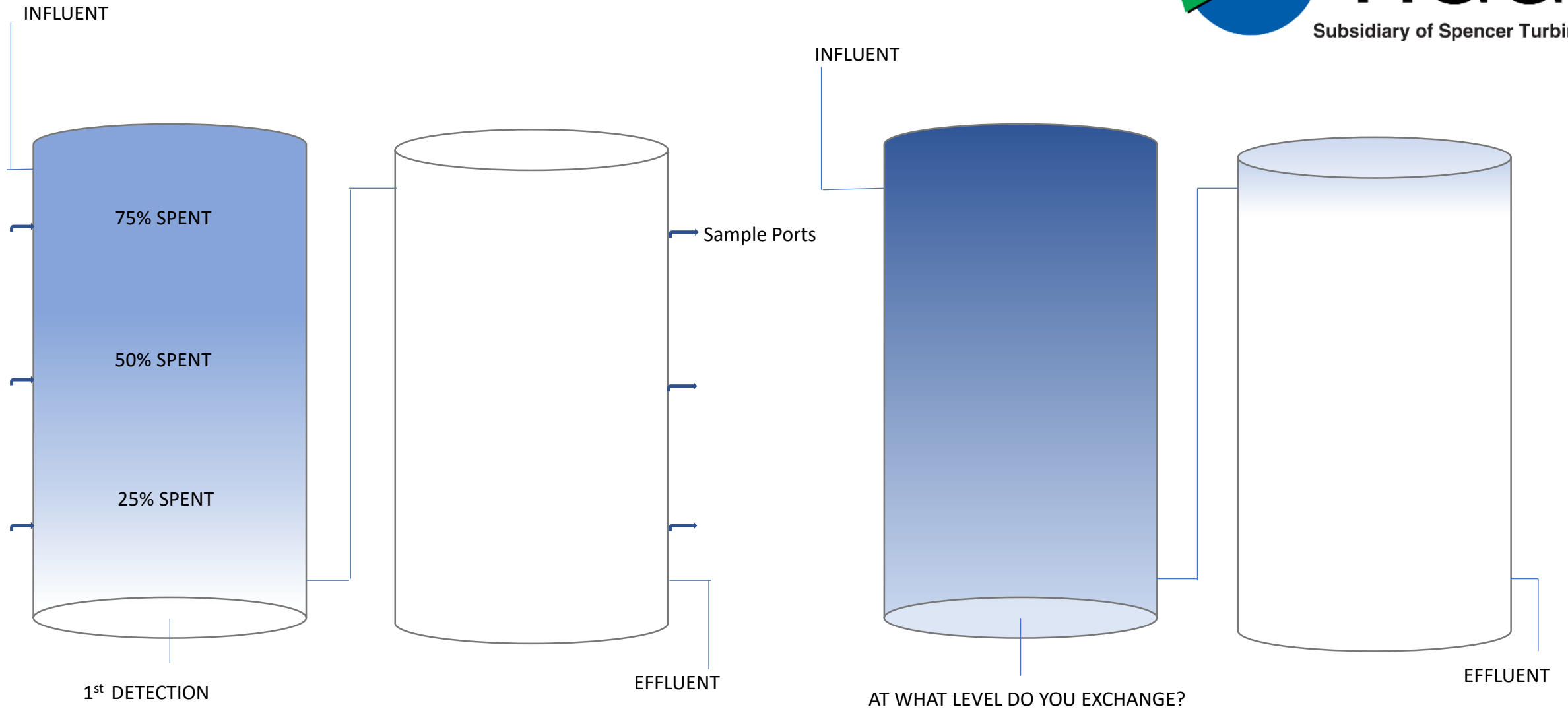
- Not all water is the same
- The reports are like a snapshot in time and must be recent
- Reports should include pH, metals, TSS, organics and inorganics as a minimum
- This information will assist in determining the loading on the media and identify materials that may be an issue for the media to work properly

Surface or Ground Water?

- Surface water is more susceptible to seasonal change and variations in water quality
- Ground water is more stable year round
- Surface water usually has a higher TOC and turbidity which causes issues with some media
- Both have different constituent characteristics which may be in competition for space on the media
- A pre filter should always be considered as part of the Best Practice

(MTZ) Mass Transfer Zone Movement Over Time





(RSSCT) Rapid Small Scale Column Test

- Compare the performance of several medias for particular contaminants
- Predict the bed-life of a media in the full-scale facility
- Months of full scale data in days with very low water requirements
- Media selection based on cost per unit of contaminant removed, not the cost per unit weight.
- Normal measurement in bed volumes

Rapid Small Scale Column Test

Series Flow



X Contact Time

X Sample Port

2X Contact Time

2X Sample Port

Single or Parallel



Multiple Media
Samples Can Be Tested
Simultaneously Using A
Manifold

Issaquah, WA



Well	Sample Port	Contaminant	6/6/2018		7/9/2018		8/1/2018	
			Raw ug/l	Treated ug/l	Raw ug/l	Treated ug/l	Raw ug/l	Treated ug/l
4	1	PFBS						
		PFHpA						
		PFHxS						
		PFNA						
		PFOS						
		PFOA						
	2	PFBS	ND	ND	ND	ND	ND	ND
		PFHpA	0.0119	ND	0.0104	ND	0.00979	ND
		PFHxS	0.138	ND	0.113	ND	0.0833	0.0115
		PFNA	0.0128	ND	0.0137	ND	0.0144	ND
		PFOS	0.34	ND	0.32	ND	0.296	0.023
		PFOA	0.00821	ND	0.012	ND	0.00981	ND
	3	PFBS	ND	ND	ND	ND	ND	ND
		PFHpA	0.0119	ND	0.0104	ND	0.00979	ND
		PFHxS	0.138	ND	0.113	ND	0.0833	ND
		PFNA	0.0128	ND	0.0137	ND	0.0144	ND
		PFOS	0.34	ND	0.32	ND	0.296	ND
		PFOA	0.00821	ND	0.012	ND	0.00981	ND
Outlet	PFBS	ND	ND	ND	ND	ND	ND	
	PFHpA	0.0119	ND	0.0104	ND	0.00979	ND	
	PFHxS	0.138	ND	0.113	ND	0.0833	ND	
	PFNA	0.0128	ND	0.0137	ND	0.0144	ND	
	PFOS	0.34	ND	0.32	ND	0.296	ND	
	PFOA	0.00821	ND	0.012	ND	0.00981	ND	

Summary of Results from Issaquah, WA

	Coconut Carbon in Lead	Coal Carbon in Lead
Time of Service	11 months	14 months
Water Processed	102 million gallons	142 million gallons
PFCs Removed	0.529 pounds	0.601 pounds
Bed Volumes w/o Breakthrough	19,092	26,525
Backwash cycles during period	4+6**	16

** During the first months of operation,

Pressure swings caused rupture disc failures resulted in 6 unintended and uncontrolled backwash incidents

Martinsburg W. VA



Monitoring and data collection since January 2018

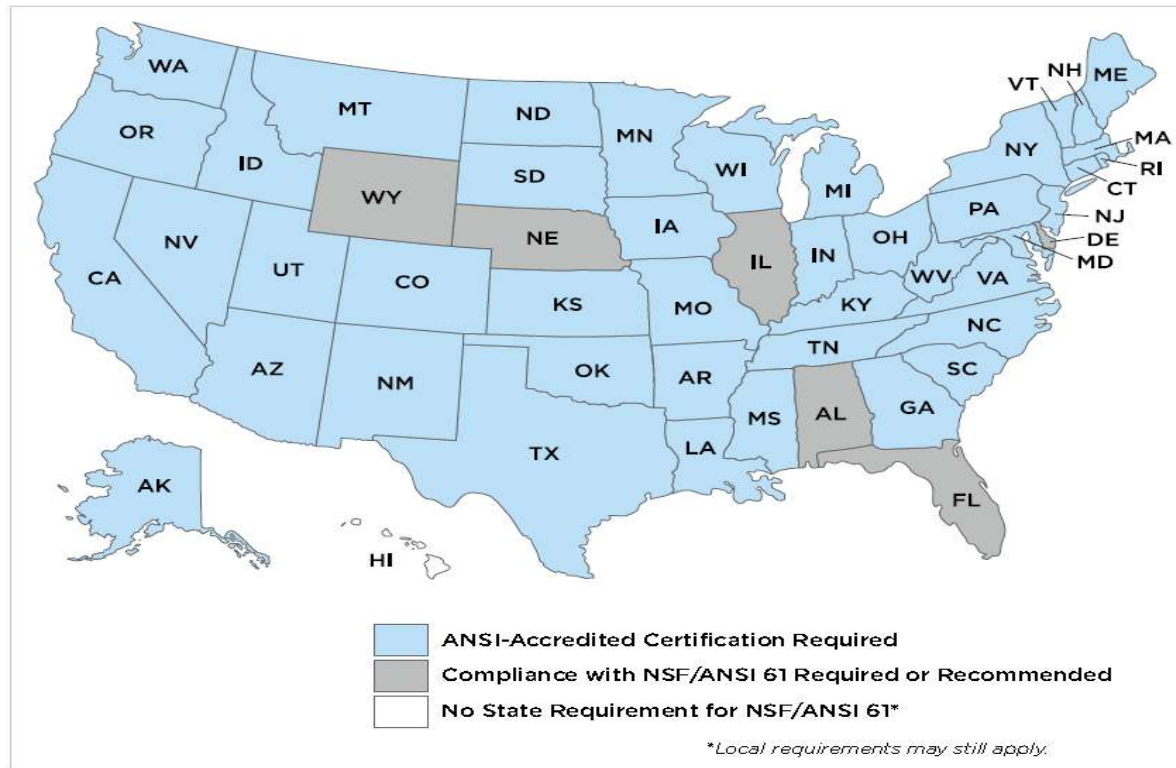
NSF/ANSI 61 U.S. COMPLIANCE REQUIREMENTS

Drinking water system components fall into two categories of regulation. Centralized water treatment plants and water distribution systems up to and including the water meter are typically regulated by state drinking water agencies. Water distribution systems downstream of the water meter or inside a building are typically regulated by state or local plumbing codes. The information shown in this document applies to products regulated by state drinking water regulatory agencies only. While all major model plumbing codes require the use of NSF/ANSI 61 certified products, the specific requirements for those product types can be found in state or local plumbing codes.

The ASDWA member survey found that 49 states have requirements for water treatment and distribution components to comply with NSF/ANSI 61. See **Figure 2** below.



FIGURE 2



April 2018: Survey of ASDWA Members — Use of NSF Standards



The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Wednesday, September 26, 2018** at 12:15 a.m. Eastern Time. Please [contact NSF International](#) to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information:

<http://info.nsf.org/Certified/PwsComponents/Listings.asp?Company=C0389039&Standard=061&>

NSF/ANSI 61 Drinking Water System Components - Health Effects

NOTE: Unless otherwise indicated for Materials, Certification is only for the Water Contact Material shown in the Listing. Click [here](#) for a list of [Abbreviations used in these Listings](#). Click [here](#) for the definitions of [Water Contact Temperatures denoted in these Listings](#).

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Mechanical Devices

Trade Designation	Size	Water Contact Temp	Water Contact Material
Miscellaneous Treatment Devices/Components[1] [G]			
CP10K-8[2]	6"	CLD 23	MLTPL
CP20K-10[3]	8"	CLD 23	MLTPL
CP20K-12[3]	8"	CLD 23	MLTPL
CP40K-12[4]	8"	CLD 23	MLTPL



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**Seeking
innovative
technology
for
groundwater
cleanup**

WWW.AFCEC.AF.MIL



Conclusions:

- The remediation and removal of PFAS is still in it's infancy
- The PFAS issue is serious and global
- GAC is used in the majority of applications and IX selective resins are seeing site specific applications
- New technologies for the removal process are still in the research mode and may be years before they can be scaled up to Municipal applications
- Use NSF 61 Certified products



