

# QUALITY ENABLES.

**Case study on the remediation of a municipal well containing PFAS in Pennsylvania, USA**

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## A comparison of **Lewatit® TP 108 DW** with a competitor's resin regarding its ability to remove PFAS from groundwater

### Application

Due to their extraordinary chemical stability, PFAS persist in the environment after release, posing significant concerns for human and animal health. Therefore, the US Environmental Protection Agency (EPA) has set strict Maximum Contaminant Levels (MCLs) for six common PFAS species in drinking water, as shown below:

**Table 1:** PFAS MCLs in drinking water according to US EPA

Compound	Final MCLG	Final MCL (enforceable levels)
PFOA	Zero	4.0 parts per trillion (ppt)*
PFOS	Zero	4.0 ppt
PFHxS	10 ppt	10 ppt
HFPO-DA**	10 ppt	10 ppt
Mixtures containing two or more of PFHxS, PFNA, HPPO-DA, or PFBS	1 Hazard index	1 Hazard index

\* Also expressed as ng/l \*\* Commonly known as GenX chemicals (<https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas>)

This case study illustrates a comparison of two selective ion exchange resins used for the treatment of contaminated groundwater with very high levels of PFAS species (table 2).

**Table 2:** Major PFAS species concentrations

PFOA	PFOS	PFHxA	PFHpA	PFNA	PFBS	PFHxS
220*	490*	92*	41*	9.2*	27*	220*

\* Raw water concentration All units are in ppt

### System design

The raw water was treated for the removal of volatile organic compounds (VOCs), followed by a cartridge filter to remove oxidized metals and any suspended solids. The groundwater was then treated with selective ion exchange resins using typical design parameters. The site originally used granular activated carbon (GAC) but found ion exchange resin significantly improved the total throughput before media replacement by a factor of 12. NSF 61-certified **Lewatit® TP 108 DW** resin was compared with a competitor's PFAS selective resin in a side-by-side column pilot.

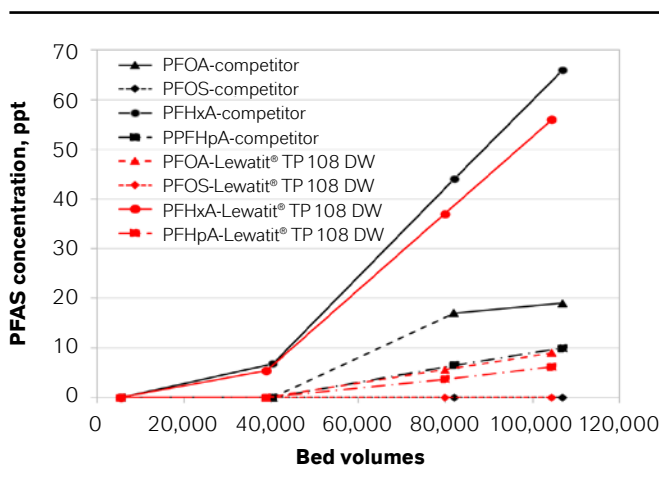
Table 3 lists the pilot design parameters, and Figure 1 shows the PFAS removal performance comparison between **Lewatit® TP 108 DW** and the competitor's resin. **Lewatit® TP 108 DW** outperformed the competitor's resin in the removal of some key PFAS species, evidenced by its lower effluent PFAS concentrations. For instance, PFOA concentration was 5.6 ppt for the water treated with **Lewatit® TP 108 DW** compared to an effluent concentration of 17 ppt for the competitor's resin after approximately 80,000 BVs. PFHxA and PFHpA exhibited performance with a similar trend to PFOA. Extrapolated, that would result in a much longer run length with lower effluent concentrations! PFOS and other sulfonated or longer-chain PFAS species (PFBS, PFHxS, and PFNA, not shown in Figure 1)

did not even see a breakthrough by the end of the pilot study (approximately 105,000 BVs). The shorter Empty Bed Contact Time (EBCT, 2 mins) used in the study was a straightforward way to compare resin performance on-site with faster results.

**Table 3:** Column pilot operating conditions

Product	Impact
Diameter	2.4 ft
Bed depth	2.4 ft
Resin volume	1.49 liters
Volumetric flow rate	750 ml/min
Hydraulic loading rate	22 m/h
EBCT	2 min
Specific velocity	20 BV/hr

**Figure 1:** Comparison of PFAS removal by Lewatit® TP 108 DW and a competitor's PFAS selective resin



### Conclusion

Lewatit® TP 108 DW is a highly selective ion exchange resin that is excellent for removing both short- and long-chain PFAS compounds. It demonstrated a higher operating capacity with the potential to handle a significantly greater number of treated bed volumes before media replacement. Lewatit® TP 108 DW is ANSI/NSF 61-certified without the need for a long rinse.

Contact your local sales representative to find out how you can achieve similar results. Resin quantities are immediately available for column or pilot testing. LANXESS can also provide a throughput estimate and process design.

**We will be happy to support your business. Please contact us for additional information: visit [www.lewatit.com](http://www.lewatit.com)**



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