IMPROVE Carbon Analysis Update

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Objectives

- Report status of IMPROVE carbon analyses
- Provide an update on 25 mm QAT-UP filter irregularities

DRI's Environmental Analysis Facility (EAF) continuously operates 10-13 Model 2015 Multiwavelength Carbon Analyzers

(January 2016- September 2024, analyzed ~323,487 samples with ~155,843 for IMPROVE)

EAF Carbon Laboratory (Magee Scientific, Berkeley, CA and Aerosol, d.o.o., Ljubljana, Slovenia)

Carbon Laboratory Operations

- **Received an average of 1,467 IMPROVE samples per month between April 2024 and September 2024 (varies from 406 to 2,400).**
- **Analyzed 11,135 IMPROVE samples from April 2024 to September 2024.**
- **Operated 11-13 hours per day, 5-7 days per week from December 2023 to July 2024. Decreased to 10 hours per day, 5 days a week from August 2024 to present.**
- **Matt Claassen has assumed responsibility since June 2021 in conjunction with Patrick Myers, who started September 2021.**

Matt 

Pat 

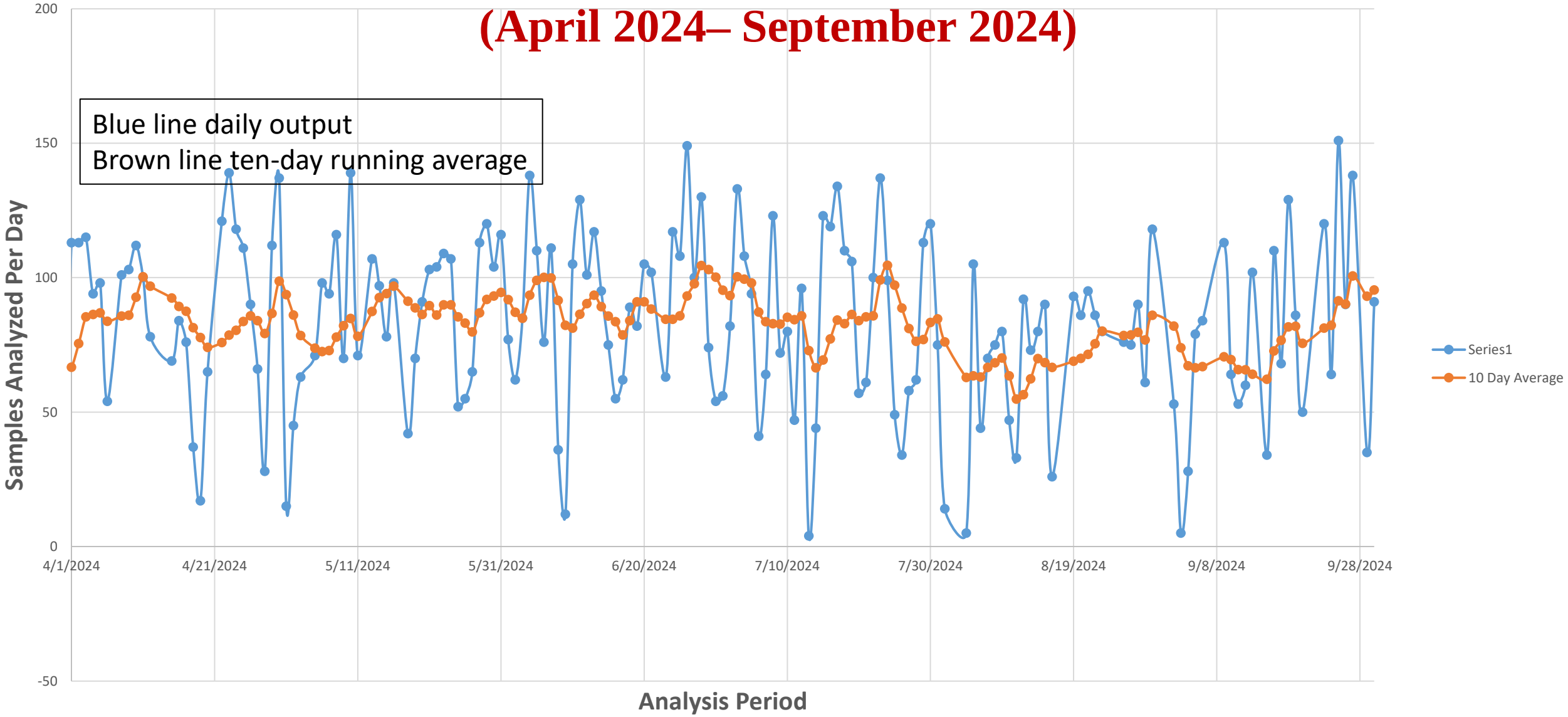
Sample analysis for 2023 completed in July 2024

Sampling Period	Samples Received Dates	Number of Samples Received	Analysis Completion Date
10/1/23 – 12/31/23	10/26/23- 3/22/23	4,500	7/24/24
1/1/2024 – 9/30/2024	2/21/24 – 10/23/24	11,600*	Late January – Mid February 2025 (est.)

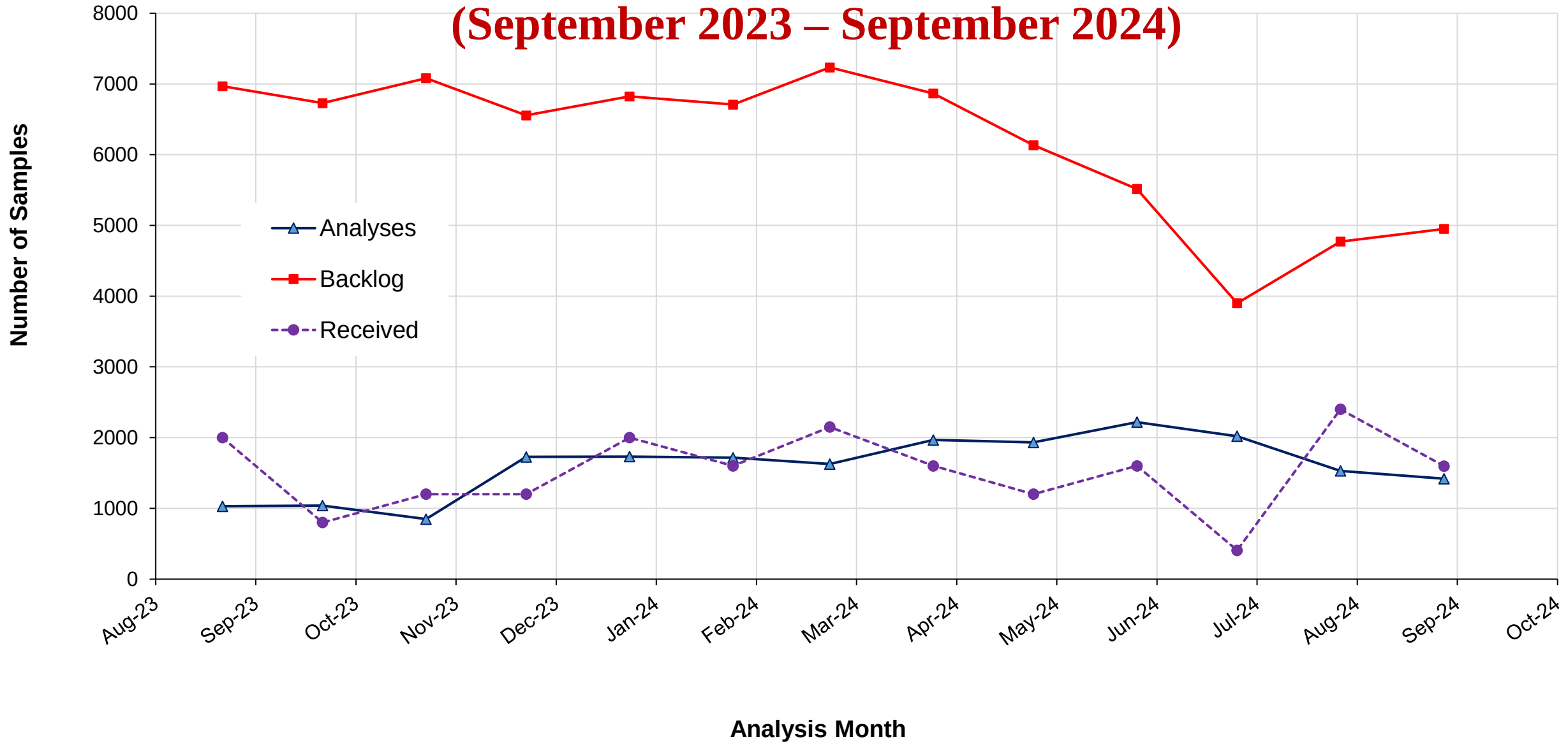
*As of 10/23/2024

Carbon throughput averaged ~ 84 samples per day (~ 9 samples per analyzer per day)

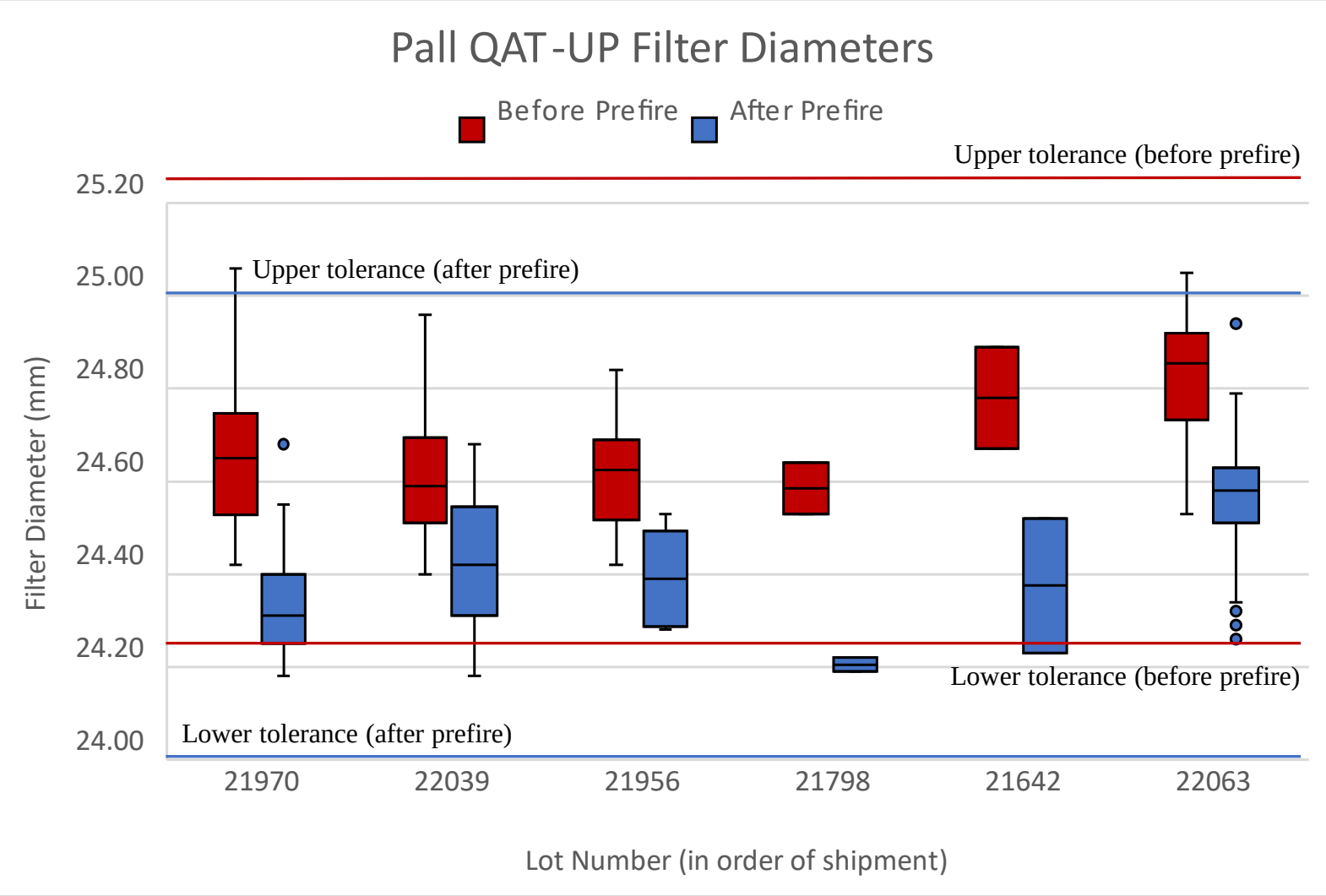
(April 2024– September 2024)



Carbon backlog has decreased in the last year

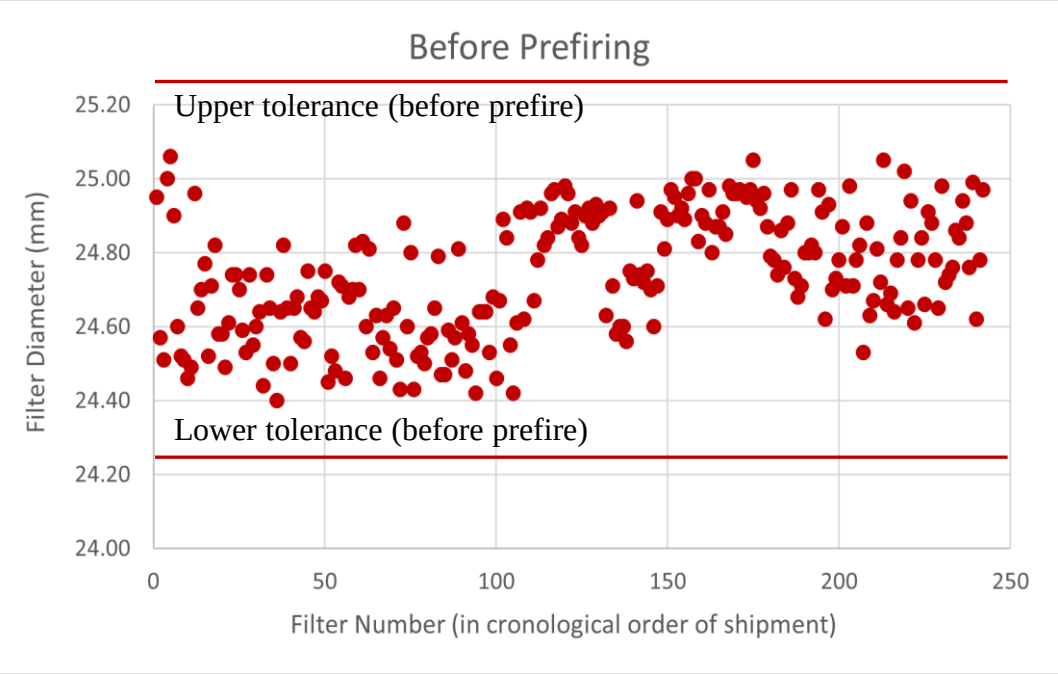


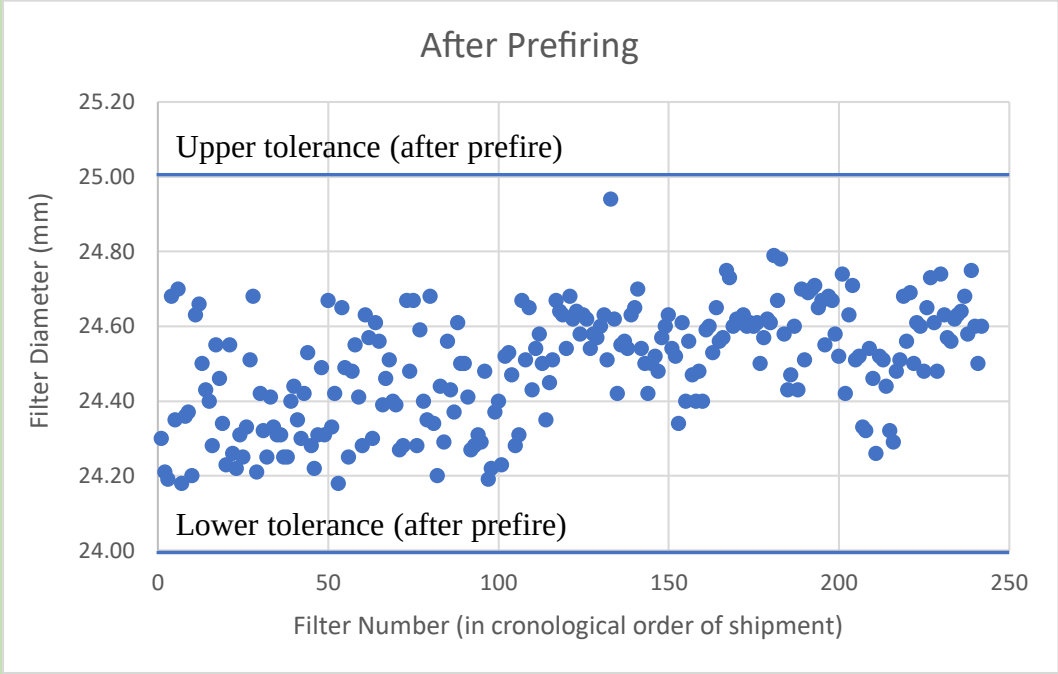
Less variation among filter lots and now within set tolerance (April 2024 – present)



- EAF measures filter diameters before and after prefiring (starting Jan. ’24)
- Average shrink is 0.25 ± 0.15 mm after pre-firing
- Lot-to-lot variation was reduced to 0.08 mm, similar to the within-lot variation (0.07 – 0.18 mm)
- No filters were rejected and returned to Cytiva.

Filter diameters are more consistent after pre-firing (April 2024 – present)





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- Wang, X.L., Gronstal, S., Lopez, B., Jung, H.J., Chen, L.-W.A., Wu, G.Y., Ho, S.S.H., Chow, J.C., Watson, J.G., Yao, Q., Yoon, S.J., (2023). Evidence of non-tailpipe emission contributions to $PM_{2.5}$ and PM_{10} near southern California highways. Environmental Pollution, 120691. 10.1016/j.envpol.2022.120691.
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