



# Aero Aggregates Lab Quality Intern: Foamed Glass Aggregate Research



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College Park Scholars Academic Showcase, May 5, 2023

## Introduction/ Issues Confronting Site

Foamed glass aggregate (FGA) is a product made from 100% recycled glass to create a strong, yet lightweight material. FGA can be used for a number of engineering applications, but it is most commonly used for structural projects. In order to manufacture FGA, glass must be cleaned, milled, mixed with a foaming agent, and heated. This process is done on a very large scale, so testing can often consume significant time and resources, however testing is necessary to understand how to improve FGA quality. Because of this, during my internship I was tasked with creating a procedure for small scale testing and performing a research project meant to inform how several production factors affect FGA quality.

## Activities

In order to complete my summer research project, I first needed to develop a standardized method for small scale testing. Following this, I was able to conduct a full factorial experiment in which I explored how FGA properties are affected by glass source location, foaming agent type, and foaming agent amount. In addition to my primary research project, I also conducted quality control testing on product loss on ignition (LOI), bulk density, and compression to ensure daily product met required specifications and I collected data related to in field bulk density tests and moisture absorption of FGA.



Figure 1 (top left): Lab produced FGA foam structure (left) compared to manufactured FGA foam structure (right).



Figure 2 (top right): FGA product falling off the cooling belt at the end of the manufacturing process.



Figure 3 (bottom right): Experimental setup of glass powder in glass fleece mold to be heated in a Nabertherm muffle furnace.

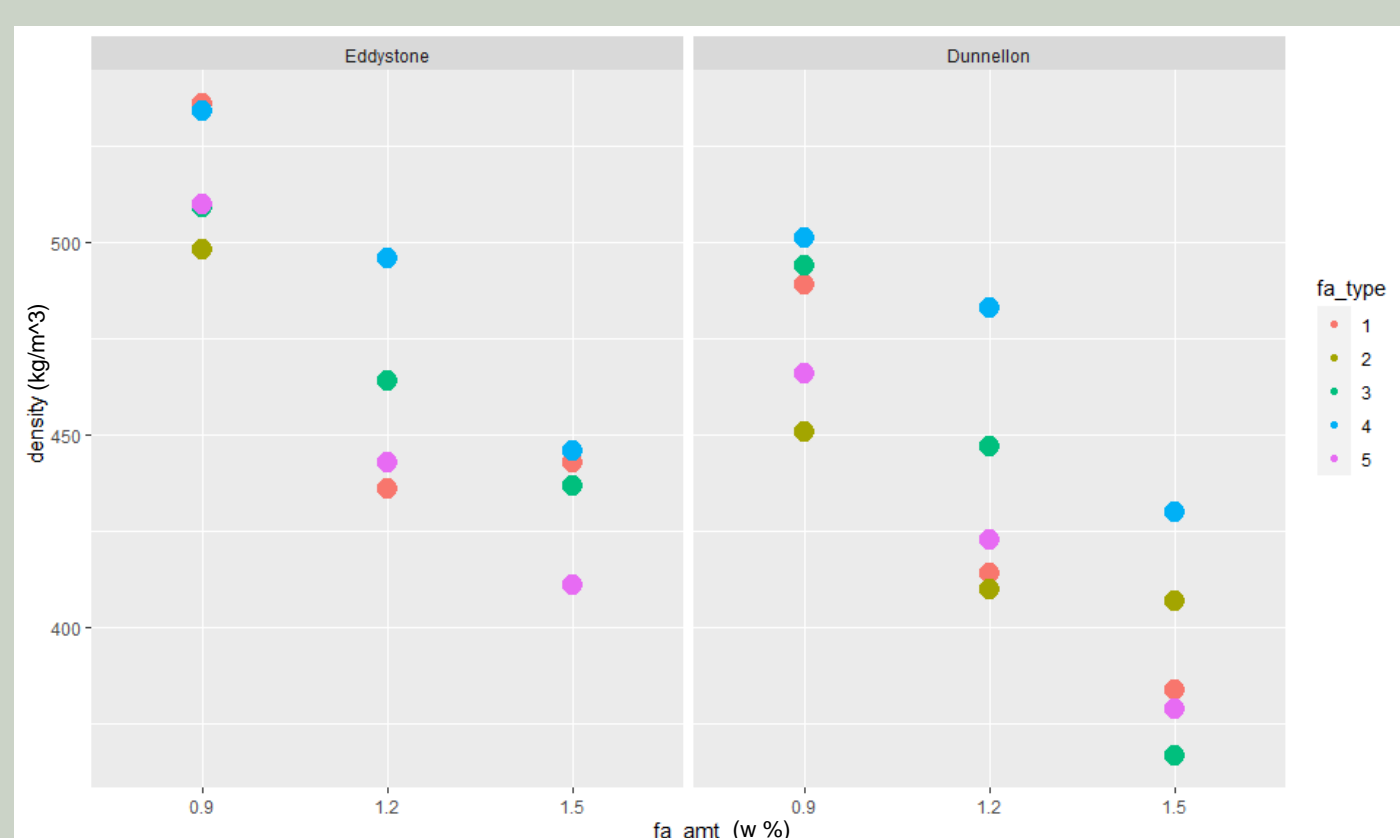


Figure 4: Density data collected based on glass type, foaming agent type, and foaming agent amount.

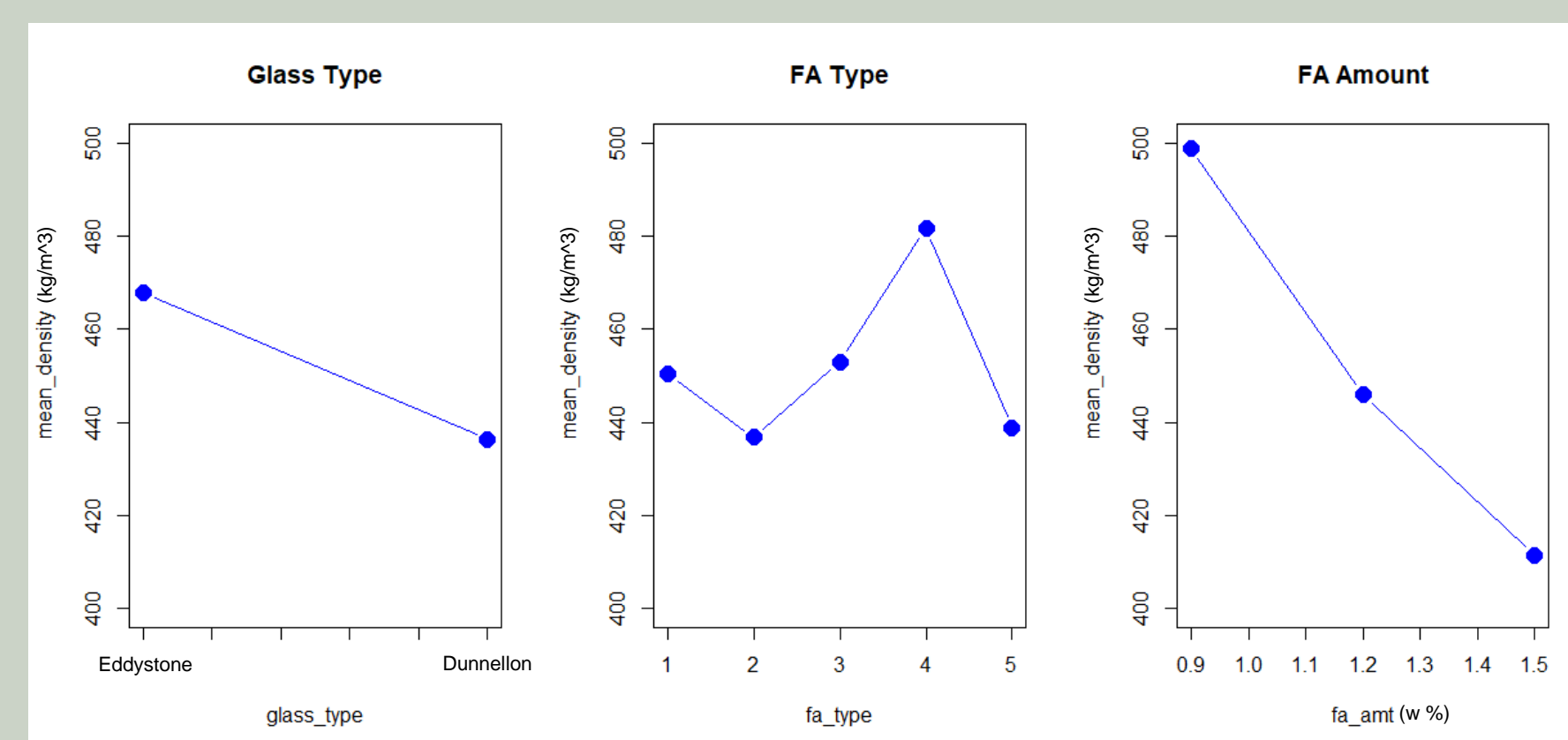


Figure 5: Mean densities at each value of the three factors investigated.

## Results

A three-way ANOVA test revealed that the effect that each of the three factors explored have on FGA density is significant. In general, it appears that Dunnellon glass, 1.5 w% foaming agent, and foaming agent type 2 produced the lowest mean densities, however more testing is needed to confirm these findings.

## Site Information

Aero Aggregates of North America, LLC  
1500 Chester Pike, Eddystone, PA 19022  
Supervisor: Theresa Loux

Site Mission: Repurpose recycled glass to create ultra-lightweight foamed glass aggregate that can be used in engineering applications

## Impact

Interning at Aero Aggregates was incredibly rewarding because gave me the opportunity gain first-hand experience in the engineering industry and provided me with valuable mentorship. There, I was able to develop practical lab skills, apply my classroom chemical engineering knowledge, and become more proficient in managing technical projects.

## Future Work

Moving forward, I am working a Chemical Engineering internship during the summer of 2023 and my time at Aero Aggregate has given me valuable skills and knowledge that I plan to apply to this internship, as well as all engineering experiences that I have throughout my career.

## Acknowledgements

I would like to thank my site supervisor Theresa Loux for the opportunities and guidance she provided, Mike Koerner and Matt McGinley for their mentorship, and the rest of the Aero Aggregates team. In addition, I would also like to thank Dr. Merck and Dr. Holtz for all of their time and effort throughout the College Park Scholars: Science and Global Change Program.

