# Purification of Energetic Materials

S2995 — Continuous Post Processing for Methyl / Ethyl NENA

## Objective

The objective of this Energetics Manufacturing Technology Center (EMTC) project is to provide a system that will permit the continuous post-treatment of energetic materials from a Corning G1 Advanced Flow Reactor (AFR). The system will be designed to quench and purify methyl / ethyl nitratoethylnitramine (NENA) but will be suitable for use with a variety of liquid energetic materials.

## Payoff

The Navy requires an on-demand capability for production and purification of liquid energetic plasticizers (NENAs) that are more stable and less sensitive than nitroglycerin. This project aims to develop a post-processor that will meet that need. The design will be based on the synthesis and purification of methyl / ethyl NENA, although other energetics materials may be synthesized. The use of the Corning G1 AFR for upstream production (developed under a previous EMTC effort with Nalas Engineering) in combination with an automated downstream quench, neutralization and separation unit (this effort, with Synthio Chemicals), allows for continuous production of NENAs. This approach offers improved heat transfer, finer control over product quality and a smaller energetics footprint (less energetic material in one physical processing unit) as compared to a Continuously Stirred Tank Reactor (CSTR). Multiple liquid energetic materials may be purified and processed through this system. While the equipment configuration is based on the synthesis of methyl / ethyl NENA, other energetic materials may be synthesized using the post-processor with agile modular design.

## Implementation

Delivery of the post-processing unit by Synthio Chemicals at Naval Surface Warfare Center Indian Head Division (NSWC IHD) is targeted for 3Q FY2025, pending availability of Building 1054. Onsite support for initial commissioning and support / training is targeted for completion in 4Q FY2025. The upstream Corning G1 AFR and related equipment are currently on site at NSWC IHD.

PERIOD OF PERFORMANCE:
October FY2022 to August FY2025

PLATFORMs:
5-inch HVP/GLGP projectile
HELM7 mortar propellant

CENTER OF EXCELLENCE:
Energetics Manufacturing Technology Center (EMTC)

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