

Department of the Navy SBIR/STTR Transition Program

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Topic # N221-013
 High-Viscosity Pre-Penetrant Etching Materials
 Applied Nanotech Inc.

WHO

SYSCOM: NAVAIR

Sponsoring Program: NAVAIR

Transition Target: NAVAIR

TPOC: (301) 342-8020

Other Transition Opportunities: We are looking to sell directly or through distributors, or license to well-known companies involved in NDT for commercial use requiring higher volume of etchant materials. Examples of prospective companies involved with NDT penetrant testing are Victor Aviation, McGean-Rohco, Inspection Technologies and ISOFLEX Radioactive LLC.

Notes: A 3-pack product in paste form to safely apply etchant materials in a single-use fashion

NDT Etchant Materials

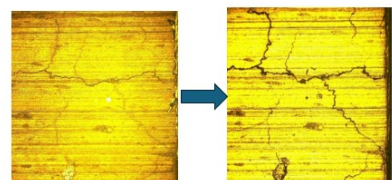


Image courtesy of Applied Nanotech Inc.

WHAT

Operational Need and Improvement: This technology a high-viscosity pre-penetrant etch material in single-use packet form to safely and easily prepare an aluminum surface for NDT penetrant testing.

Specifications Required:

- a) Etch rates > 0.5 $\mu\text{m}/\text{min}$, specified as (0.508 - 2.54 $\mu\text{m}/\text{min}$) for aircraft-grade aluminum. The etchant must etch in a controlled, uniform, and timely manner to remove $\sim 0.0002''$ ($\sim 5\mu\text{m}$) from the aluminum part. 30-minute exposure is permitted at the lower temperatures.
- b) Rheology of 70,000 – 100,000 cP (consistency of toothpaste). The chemicals should have high enough viscosity so it doesn't pose a spill hazard, can be safely applied to components in a full range of orientations, and will not wick into faying surfaces. Enhanced user safety is an inherent byproduct of higher rheology.
- c) Uniform etch rates on aircraft-grade aluminum surfaces at 10 $^\circ$, 20 $^\circ$ (\sim room temperature) and 49 $^\circ$.
- d) Minimum shelf-life requirements > 12 months.
- e) Incorporate the etchant materials into a single-use packet form.

Technology Developed: A 3-packet solution, including an etchant, desmutting agent, and a neutralizer, for safer pre-penetrant surface preparation for NDT penetrant testing on aluminum surfaces.

Warfighter Value: A safer, single-use alternative to traditional methods of surface preparation for UV-penetrant NDT testing. This is most useful for application on a carrier or forward bases.

WHEN

Contract Number: N68335-24-C-0053

Ending on: Dec 29, 2025

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Achieved 0.5 microns/min etch rate at < 30 $^\circ\text{C}$.	Medium	Surface profilometer test	4	3rd QTR FY24
Lifetime of 6 months at 20C confirmed	Low	Maintaining viscosity and etch rates	4	3rd QTR FY23
Packets survive the weight of 25 lbs on the package over 10-49?	Low	Packets maintain integrity	5	3rd QTR FY24
Shelf-life < 12 month	Medium	Shelf-life < 12 month	6	3rd QTR FY25
Scale-up to 5000 kits	Low	Produce	7	1st QTR FY26

HOW

Projected Business Model: Sell product directly to end customers or through distributors. We are open to licensing to interested parties. We are capable of manufacturing to meet low-rate initial production demands (LRIP), but we intend to use contract manufacturers or license to meet full-rate production (FRP).

Company Objectives: Our objective is to finalize this product then commercialize the technology through direct sales, distribution agreements and/or licensing. We are open to consider other avenues of commercialization.

Potential Commercial Applications: Inspection of commercial aircraft equipment would be a direct commercial application. NDI inspection is used in oil and gas exploration, refineries and pipeline transportation, ocean cargo vessels, railways and aluminum industries in general. New formulations can be developed for other materials.

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