

Hydra Tamper Indicating Seal

Benefits

- ▶ In-situ verification
- ▶ Secures loop without the need for knots or crimps
- ▶ Novel 3-D authentication features
- ▶ Cubic design facilitates authentication imaging
- ▶ Lightweight

Applications and Industries

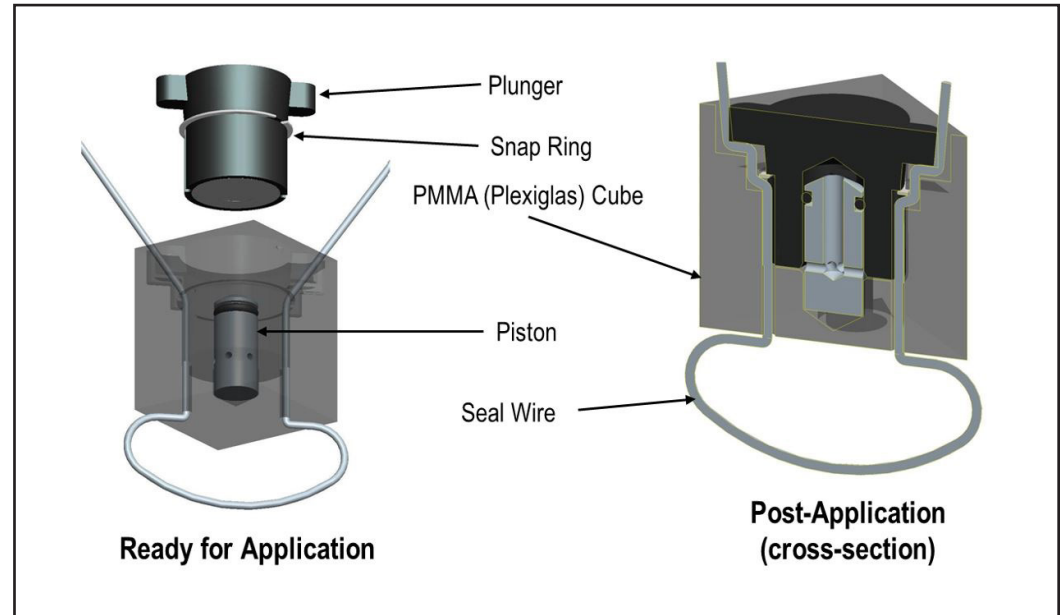
- ▶ Potential uses of this seal are for securing of items for nuclear arms control verification, international safeguards (IAEA, EURATOM, etc.), or in other applications where a high-security passive seal is needed.

Contact Information

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Technology Overview



The Hydra Seal before and after application. It consists of three major components - the seal wire, the PMMA cube, or body, and the Plunger

Savannah River National Laboratory, along with Pacific Northwest National Laboratory, the UK Atomic Weapons Establishment, and Milagro Consulting, has developed the Hydra Seal, which is a passive tamper indicating loop seal device (TID). The Hydra Seal utilizes a polished clear acrylic cube, additively manufactured mating components, and UV-cured adhesive; resulting in a high-security seal with features that make the seal difficult to counterfeit.

Description

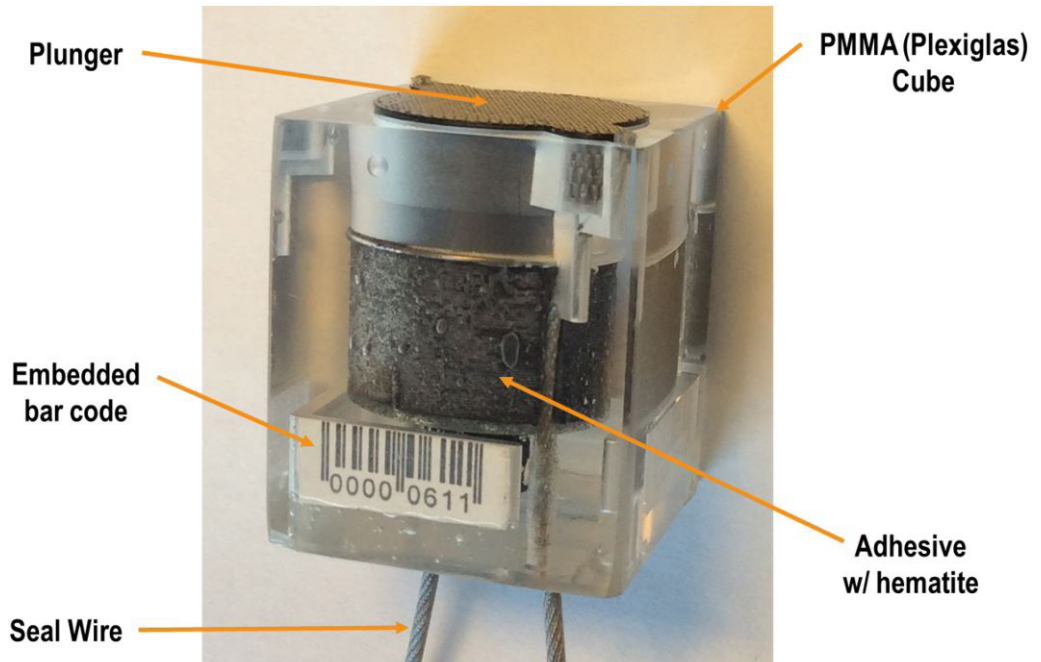
The Hydra Seal was funded by NNSA for potential nuclear arms control applications, but could be used in various industries to deter tampering with high-value or security sensitive items. The internal component (plunger) contains UV-curable adhesive with embedded reflective particles. After the seal wire has been passed through a hasp or around the item to be secured, the ends of the wire are inserted into the clear cube and the plunger is inserted into the cube. The insertion process causes UV curable adhesive to disperse in the annular space between the cube and the plunger. SRNL developed a custom seal reader that cures the adhesive and takes eight photographic images of inserted seal, two of each faces and each with a different lighting angle. Images taken during seal application can later be compared with images taken at a later date, which allows for robust verification of seal authenticity in-situ without removing the seal.

Technology transfer

The Savannah River National Laboratory (SRNL) is the U.S. Department of Energy's (DOE) applied research and development laboratory at the Savannah River Site (SRS). With its wide spectrum of expertise in areas such as homeland security, hydrogen technology, materials, sensors, and environmental science, SRNL's cutting-edge technology delivers high dividends to its customers. The management and operating contractor for SRNL is Battelle Savannah River Alliance, LLC. BSRA is responsible for transferring its technologies to the private sector so that these technologies may have the collateral benefit of enhancing U.S. economic competitiveness.

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A Closed Hydra Seal

Intellectual Property

- U.S. Patent No. 10,679,523 B2 has been granted for this seal under the title, "Tamper Indicating Seal".
- Could be considered TRL-7 in its current form, as Hydra Seals have been deployed for a 12-month test in the Savannah River Site K-Area Material Storage Facility (KAMS). Likely would need to be modified to improve manufacturability and cost – TRL-5 would be more accurate in this case.
- Availability - All seals to date have been assembled by SRNL.

Partnering opportunities

SRNL invites interested companies with proven capabilities in this area of expertise to develop commercial applications for this process under a cooperative research and development agreement (CRADA) or licensing agreement. Interested companies will be requested to submit a business plan setting forth company qualifications, strategies, activities, and milestones for commercializing this invention. Qualifications should include past experience at bringing similar products to market, reasonable schedule for product launch, sufficient manufacturing capacity, established distribution networks, and evidence of sufficient financial resources for product development and launch.