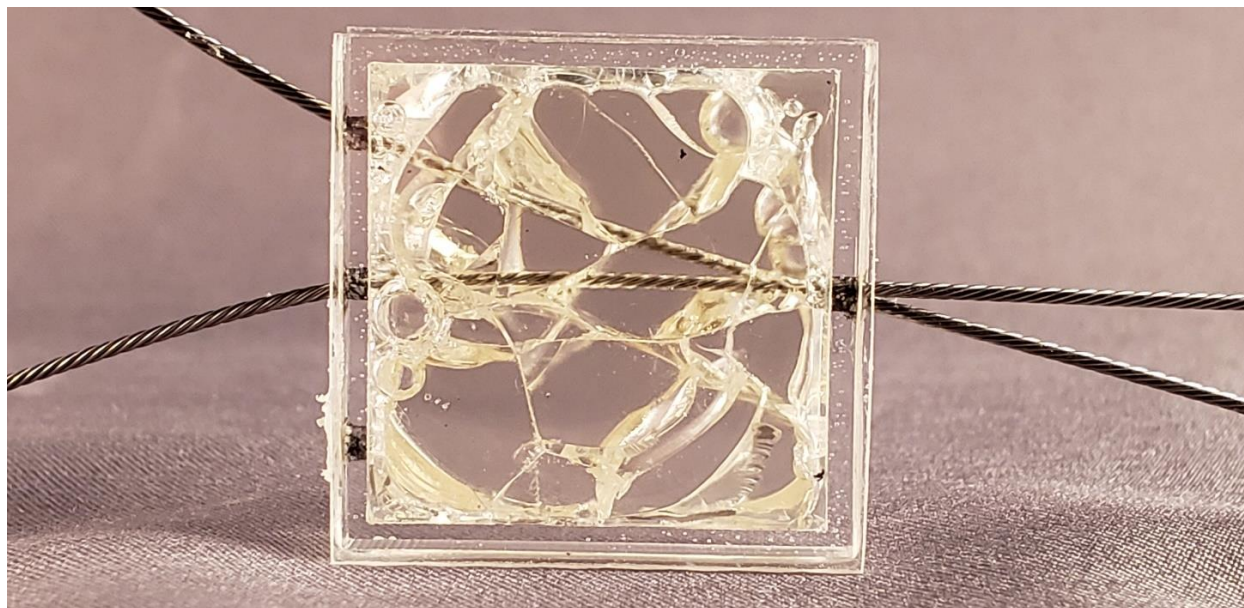


FAST™ SEALS FOR TAMPER INDICATION & AUTHENTICATION



FAST® Tags Product Description

The Frangible Authentication Security Tag (FAST™) seals are intended for use as a cup seal wherein both ends of a security cable or wire are routed through a series of wire lock openings or a hasp and then back into the seal which is subsequently cured and self-shatters into a non-predetermined crack pattern. This pattern is 3D in nature and becomes the unique ID authentication pattern for each seal. Attempts to remove the wire from the seal result in progression of the crack pattern and indicate tampering. Typical verification is accomplished with an optical imaging blink analysis for visual or software-enabled change detection in the seal before and after an unattended period of use. ®

Mechanical Properties

Pull-out strength of FAST™ seals as determined by Instron testing of samples with different configurations. Test results and conditions are given below.

	FAST Tag single wire	FAST Tag single wire with twist ¹	FAST Tag braided wire ²	FAST Tag braided wire with twist ^{1,2}	FAST Tag coated wire ^{3,4}	FAST Tag coated wire with twist ^{1,3,4}
FAST Tag Pull-Out Strength (kgf)	20.04 ± 4.40	30.82 ± 2.25	26.4 ± 1.20	23.34 ± 2.35	15.53 ± 1.80	18.10 ± 1.16

¹Twisting is two, single braided or coated wires twisted together

²Braided wire is composed of multiple fine strands braided together

³Coated wire is a braided wire coated with FEP for corrosion resistance

⁴Coated wires failed at FEP coating, allowing the wires to pull out and leaving the casing adhered inside the FAST™ seal.

Environmental Stability

FAST™ Tags have been tested for various environmental conditions to determine their stability and lifetime expectancy. These ongoing tests include thermal shock, thermal cycling, moisture resistance, shock and vibration, and solar radiation resistance from mild to harsh conditions.

Thermal Shock:

Tests at -7 to 30 °C temperature range with a 30 min interval between each temperature, creating a thermal stress in the polymer system. Samples showed good stability under thermal shock.

Thermal Cycling:

Tests are ongoing.

Moisture Resistance:

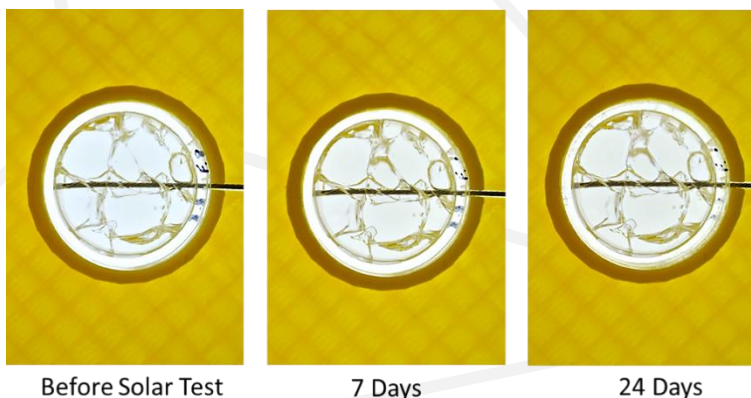
Tests are ongoing at 35 °C with a relative humidity of 90-93%.

Vibration Stability:

Tests are ongoing.

Solar Radiation:

FAST™ Tags tested against solar radiation for 24 for days, equivalent to total solar radiation aging for 18 months according to AECTP 230 standard for A3 climate zone. The Gardner Color Scale was measured as 1.5 before and <3 after 24 days.



Gamma radiation

Tests are ongoing

Disclaimer

The information contained in this paper is intended as advice only and whilst the information is provided in utmost good faith and has been based on the best information currently available, is to be relied upon at the user's own risk. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. No liability will be accepted by TETRAMER for damages of any nature whatsoever resulting from the use of or reliance on the information.

TETRAMER TECHNOLOGIES, L.L.C.

657 S. Mechanic St. | Pendleton, SC 29670 | (864) 646-6282 | Tetramer.com