



NanoSonic, Inc

PRODUCT INFORMATION

www.nanosonic.com

HybridSil® C² Repairing Sealant Kit NSM-HS-PR

Product Description

NanoSonic worked with the Navy to develop a low-cost, easily applied ceramic copolymer (C²) leak repairing resin kit. The HybridSil kit materials allow for the quick repair of leaking JP-5 fuel lines without risk of further defect corrosion. In order to meet the Navy's rigorous standards, NanoSonic conducted extensive studies to ensure C² resins have the mechanical and chemical resilience required to provide performance above and beyond that of current commercial systems in use.



Proven Under Pressure

While most leaks are pinhole sized, the Navy challenged NanoSonic to repair leaks from both 1/8" diameter holes and 1" lacerations in high-pressure pipes. To test these repairs, NanoSonic built the fuel circulating system shown in the picture to the left. This system can operate at pressures ranging from 330-360 psi and flow rates from 5-8 ft/second. All repairs made with HybridSil C² resins remained leakproof through at least 40 hours of exposure with no visible JP-5 leakage or pressure drops.

Chemically Resilient

In order to ensure that fuel exposed to HybridSil C² repairs remained uncontaminated, NanoSonic used a third-party testing laboratory to conduct fuel purity tests in accordance with the ASTM listed in the table below. Samples of cured C² resins were submerged in 1-liter of JP-5 for 1,000 and 2,000 hours, after which fuel samples were taken and submitted for testing. Navy fuel purity engineers examined the results, also shown in the table below, and determined they were acceptable for use on in-service aircraft carriers.

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No Warranties: Product is sold with no warranties, representation or guarantees expressed, implied or otherwise.



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SAMPLE	ASTM D6045 COLOR	ASTM D381 EXISTENT GUM	ASTM D1094 CHANGE IN AQ. LAYER	ASTM D1094 INTERFACE CONDITION	ASTM D1094 DEGREE OF SEPARATION	ASTM D3948 MSEP RATING
JP-5 1,000 Hour Control	6	<1 mg/100mL	0.0 mL	1	1	87
JP-5 Exposed to Pipe Repair Material for 1,000-Hour	4	2 mg/100mL	0.0 mL	1	1	84
JP-5 2,000 Hour Control	4	1 mg/100mL	0.0 mL	1	1	87
JP-5 Exposed to Pipe Repair Material for 2,000-Hours	2	1 mg/100mL	0.0 mL	1	1	81

Strong Adhesion

HybridSil C² repair resins have been tested on multiple metal substrates in accordance with ASTM D1002 and the results are shown in the table below.

Metal Substrate	Resin Type	Average Adhesive Strength (kN)	Failure Mode
304L Stainless Steel	Reinforcement	3.8	Cohesive Failure
316L Stainless Steel	Reinforcement	4.3	Cohesive Failure
A36 Steel	Reinforcement	3.1	Cohesive Failure
T6061-T6 Aluminum	Reinforcement	4.6	Cohesive Failure
304L Stainless Steel	Repair	2.5	Adhesion Failure
316L Stainless Steel	Repair	2.7	Cohesive Failure
A36 Steel	Repair	3.4	Cohesive Failure
T6061-T6 Aluminum	Repair	2.7	Cohesive Failure

Product Information

For additional product information, please contact a NanoSonic sales representative:

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