2019 Award Nomination

Title of Innovation:

MIC-GUARD COATING & LINING ADDITIVE

Nominee(s)

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BTG Products

Category:

Other- Coating Additive

Coatings and Linings	Instrumentation
Cathodic Protection	Testing
Materials Design	Integrity Assessment
Chemical Treatment	Other—fill in

Dates of Innovation Development:

02/2015- 08/2017

Web site:

https://www.btgproducts.com/

Summary Description:

MIC-GUARD Coating Additive is a powder product that is incorporated into industrial linings, coatings, and molded products to inhibit the growth of mold, mildew, bacteria, and other microorganisms. MIC-GUARD enhanced products create surfaces that neutralize bacteria and inhibit the development of biofilm accumulation. MIC-GUARD utilizes a patented combustion synthesized material to fight microbial growth, even in the harshest conditions. Mix it into industrial coatings and linings to fight microbiological influence corrosion, mold and mildew accumulation, and biofouling.

Full Description:

(Please provide complete answers to the questions below. Graphs, charts, and photos can be inserted to support the answers.)

1. What is the innovation?

MIC-Guard is a combustion synthesized ceramic-metallic powder that has been shown to produce up to six logs of surface-borne bacterial neutralization when mixed as an additive in coatings. MIC-Guard is an easy to use, long-lasting solution to microbial problems. It comes in a powder form and is easily mixed into most coatings and linings at weight percentages. The coatings and linings can range of HDPE linings for pipeline to aerosolized thin films for aircraft.

2. How does the innovation work?

The powder utilizes an ionic mitigation method. Before bacteria can reproduce on the surface the ions of the powder are released and destroy the bacteria's structure.

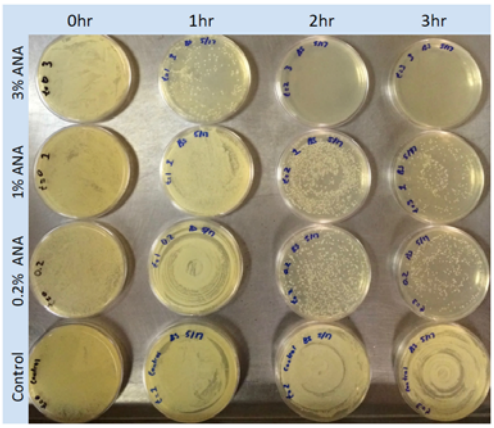
3. Describe the corrosion problem or technological gap that sparked the development of the innovation? How does the innovation improve upon existing methods/technologies to address this corrosion problem or provide a new solution to bridge the technology gap?

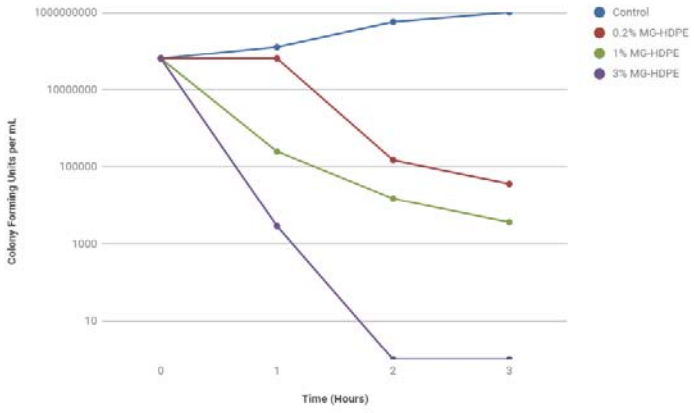
Microbiologically influenced corrosion plagues every structure or system that comes into contact with water or moisture. Currently, the preventative measures of MIC are coatings, additives or chemicals. MIC-GUARD's production of combustion synthesis or "formed through fire" is what sets it apart from other preventatives. MIC-GUARD is engineered to tolerate harsh conditions with high temperature or pressure. MIC-GUARD is embedded into the coating or lining homogenously during the coating process. This technique allows for a permanent solution to combat biological growth. Using this powder additive can maintain or improve components performance life and production and provide resistance to corrosion.

4. Has the innovation been tested in the laboratory or in the field? If so, please describe any tests or field demonstrations and the results that support the capability and feasibility of the innovation.

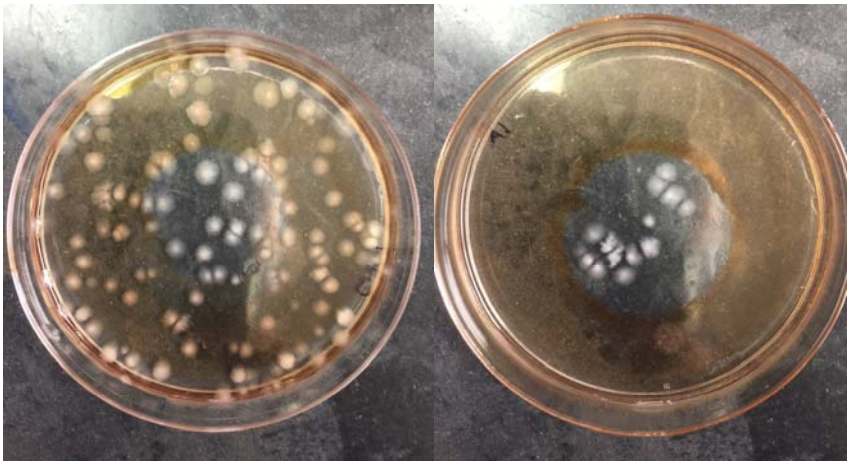
MIC-GUARD has experienced extensive laboratory testing over the years as a raw powder and embedded into a variety of coatings. The easiest incorporation of MIC-GUARD is with HDPE powder and rotationally lined onto a steel substrate. The MIC-Guard homogenously is dispersed within the lining and can provide the surface of the HDPE with a shield of protection from biofilm development. MIC-GUARD within HDPE was testing using ASTM E2149 which is the standard test method for determining the antimicrobial activity of antimicrobial agents under dynamic contact conditions. MIC-GUARD was incorporated into the HDPE at a feasible 0.2%, 1%, and 3%. All samples were tested against *Staphylococcus aureus* and samples were taken

from the inoculated water every hour for three hours. The increase of MIC-GUARD percentage resulted with a rapid decline of colony counts per unit.





MIC-GUARD has also been tested while incoporated into hydrophobic sealant used on the surface of aircrafts. The sealent treated with MIC-GUARD was aerosolized for faster application. The treated sealant and control sealant were sprayed into dishes with the middle's covered. Agar innoculated with Bascillus megaterium was then poured directly over the coated petri dishes. The treated sealant on the right was able to resist the growth of bacteria colonies on top of the coating. The growth in the middle of each plate indicates that bacteria could grow freely on the agar if there was not an inhibitor present.



5. How can the innovation be incorporated into existing corrosion prevention and control activities and how does it benefit the industry/industries it serves (i.e., does it provide a cost and/or time savings; improve an inspection, testing, or data collection process; help to extend the service life of assets or corrosion-control systems, etc.)?

MIC-GUARD can be incorporated into any coating and linings that are in an area of microbiological concern. Once incorporated MIC-GUARD can be a permanent solution to combat bacteria growth. Not only does the additive fight against corrosion but it increases the life expectancy of components and reduces time and money spent on usual MIC cleaning.

6. Is the innovation commercially available? If yes, how long has it been utilized? If not, what is the next step in making the innovation commercially available? What are the challenges, if any, that may affect further development or use of this innovation and how could they be overcome?

Yes, MIC-GUARD is currently commercially available through BTG Products. The first project MIC-GUARD was incorporated into was an offshore platform in the Gulf in Mexico in September of 2017. Since then similar projects have been started and this will be the best direction for MIC-GUARD's future. The challenge of MIC-GUARD is very few coating and lining companies are worried about their susceptibility to MIC and are not currently using additives to combat bacteria growth. Growing awareness as well as a product has been the hardest challenge of promoting MIC-GUARD. With an increase in projects this will lead to advocates of MIC-GUARD and bacteria defense as a whole.

7. Are there any patents related to this work? If yes, please provide the patent title, number, and inventor.

Antimicrobial Metallic Nanofoam and Related Methods

Patent Number 9,512,324

Inventors: Emily Hunt and Michelle Pantoya