2019 Award Nomination

Title of Innovation:
Fully Encapsulated Insulation Systems

Nominee(s)
(insert Name[s] and Organization[s])

Category:
Coatings and Linings
Cathodic Protection
Materials Design
Chemical Treatment

Instrumentation
Testing
Integrity Assessment
Other—fill in

Dates of Innovation Development:
(April 2014 to Present)

Web site: www.dragonjacket.com

Summary Description:
Dragon Jacket Insulation is the leader in engineered pre-jacketed insulation systems that provide solutions to the industrial insulation markets while eliminating the costliest expenses due to insulation failures. Each system is engineered to be installed easily and offers a safer alternative to traditional styles of insulation. This results in significant labor savings and quicker returns to service. Thermal and operational efficiencies are greatly increased with the static R-value and K-factors that are inherent in the product, which in turn provide a dramatic increase in ROI.

Dragon Jacket Insulation’s systems eliminate CUI caused from insulation failures by providing insulation that does not allow for moisture to penetrate the outer barrier. The insulation is fully encapsulated, designed for early leak detection and allows moisture from the pipes to escape without pooling. There are no active conductors in the insulation or jacketing to react with the moisture and piping material.
Dragon Jacket Insulation provides multiple industries with modular insulation systems engineered for CUI and thermal management solutions. The superior durability and impermeable barrier to moisture of the outer jacketing allows Dragon Jacket Insulation’s systems to withstand the rigorous demands of daily operations and substrate expansion and contraction caused by harsh weather cycles. The re-usability allows for quicker return to service, as well as drastically reduced overhead from product replacement.

The closed cell foam is fully encapsulated with 100% polyurea to form innovative pre-jacketed insulation systems that increase operational efficiencies, drastically reduce downtown and lower the overall cost of ownership. All Dragon Jacket Insulation’s systems are engineered to seamlessly integrate from system to system and may also be utilized with existing insulation products.
**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?**

Dragon Jacket Insulation’s innovation is Insulation systems engineered from closed cell foam and fully encapsulated with 360° of a rigid barrier (polyurea) that is impermeable to moisture and chemicals and maintains a static R-Value and K-Factor.

2. **How does the innovation work?**

The innovation works to eliminate CUI from insulation failures in a couple of ways—

- The closed cell foam does not absorb moisture and is 100% fully encapsulated by the polyurea. The polyurea jacketing is impermeable to moisture providing the underlying pipe and the insulating material with 360° of full protection which results in truly waterproof and highly chemical resistant all-inclusive insulation systems.

- The chemical makeup of the outer shell or jacketing of Dragon Jacket Insulation’s products maintain a static R-Value and K-Factor, and do not contain any chemicals or agents that will react with the underlying pipe or material being insulated to promote CUI. With Dragon Jacket Insulation CUI from insulation or coating failures is eliminated.
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?

Corrosion has always been an issue in the insulation industry, and so has durability. The market was lacking an insulation product that possessed all the features and benefits to withstand the rigorous demands of the North Dakota Oilfields. Dragon Jacket Insulation was developed to address these issues and through the years has continued to improve upon the product designs from tests, trials, and direct customer feedback to provide an innovative solution that has spread across multiple industries and applications.

Dragon Jacket Insulation’s insulation systems provide a new solution to bridge the technology gap of corrosion within the industrial insulation industry by manufacturing “all-in-one” modular waterproof insulation systems with 360° of rigid protection. The high elongation and tensile strength of the rigid outer jacketing of the insulation systems creates an impermeable barrier to moisture and does not contain any conductors or agents that promote CUI or allow moisture to access the fully encapsulated closed cell foam core. If there were a leak in the system being insulated, this would be quickly detected due to the drip edge on Dragon Jacket Insulation’s systems. The moisture has enough room to escape without damaging or changing the R-Value and K-Factor of the insulation or adding any corrosive agents to the underlying pipe.

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.

Dragon Jacket Insulation has been installed in North Dakota oilfields since the Spring of 2014, and the same insulation systems that were originally installed are still fully in tact while maintaining all thermal properties. The underlying pipes have not experienced any CUI and have maintained all operational efficiencies despite the field undergoing many changes over the past 4 years.
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.)?

The innovation can be incorporated into existing corrosion prevention and control activities by being used in conjunction with existing insulation products or coatings, however; additional coatings on the underlying pipes isn’t needed with Dragon Jacket Insulation’s insulation systems.

Delivering Superior Efficiency Gains Across Multiple Industrial Applications

Dragon Jacket Insulation benefits the industries served by providing modular insulation systems that are installed by opening, closing, and either banding or bolting the insulation closed. The installation process is much quicker (up to 16 times faster than traditional insulation products) and doesn’t require special tools or machinery and can be completed with less workers in less time. This computes to major time savings resulting in drastic decrease in downtime for quicker returns to service. Inspections can be done without replacing insulation, due to the re-usability of Dragon Jacket Insulation’s systems. Systems that require regular inspections, testing, or data collection can be insulated with access points that allow for the insulation to remain fully installed.

Protecting and Extending the Service Life of Critical Assets

The service life of the assets being insulated is greatly extended from the rigid outer shell fully encapsulating the closed cell foam because the outer shell serves as a barrier to exterior elements, as well as interior protection in between the system being insulated and the closed cell foam insulation. In the circumstance of a leak, any moisture from the pipe can escape via the thin drip edge engineered onto all of Dragon Jacket Insulation’s systems. This allows for early leak detection within 3ft. sections eliminating the guess work out of where a leak could have originated. Dragon Jacket Insulation’s systems can be quickly removed, wiped, and replaced, which results in energy, time, and money saved.
Improving Inspections & Providing a Quicker Return to Service

Most insulation that is along the ground gets stepped on and damaged as workers go about their daily activities and checks. Insulation that is higher, and has ladders laid against them get damaged as well. Most insulation in industrial settings have scheduled maintenance and when this occurs, the insulation must be replaced. In all these cases, Dragon Jacket will maintain its shape and performance, not have to be replaced in high traffic areas, and can continue to be re-used many times during scheduled maintenance. Dragon Jacket Insulation’s systems can be just as quickly and easily removed as they are installed, making inspections and maintenance checks faster, and less costly by not having to replace the insulation, and allowing for a significantly quicker return to service, which is especially crucial for staying on schedule and budget for shut downs and turnarounds.

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?

Dragon Jacket Insulation’s engineered insulation systems are commercially available and have been utilized since the Spring of 2014. The challenges of further development have not yet presented themselves, only opportunities.

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

Dragon Jacket Insulation’s insulation systems are patented in the United States and Canada.

**Patent title:** Encapsulated Insulation  
**Patent number:** US 9,157,565 B2  
**Inventor:** Adrian William Zettell