ENGINEERING FOR USEFUL LIFE:

How Hansen Customers Adopted the New ACT Coating to Eliminate Valve Maintenance

EXECUTIVE SUMMARY

As new technology evolves and advances the cold chain, refrigerated facility owners are taking a new approach to maintenance – making operational decisions and specifying equipment for long term efficiency over immediate ROI. For Hansen, developing a way to engineer beyond corrosion helped the company meet a range of customer needs, and revealed new insights into how facilities are choosing piping and valve materials in today's competitive environment.

While many in the industry are eyeing stainless steel piping for its potential to boost efficiency and reduce maintenance – the high cost of the material, particularly in light of looming U.S. steel tariffs and the current narrow availability of valves designed for industrial refrigeration – has created a reluctance to make a full commitment to stainless in the near future.

Meanwhile, facilities continue to face the ever-mounting pressure to make better, more efficient design and maintenance decisions that make the best use of personnel in the face of an industry-wide labor shortage. Additionally, ever higher standards for facility visibility from customers and regulators, changing operating environments and a renewed focus on leaving piping and valve systems undisturbed for their useful life, has end-users reconsidering how they approach the industry-standard carbon steel option for pipes and valves in an ammonia system.

The degree to which facility owners can fully realize new competitive standards for efficiency and make decisions that yield the best ROI will depend in large part on how they engineer to eliminate unnecessary maintenance today.

Drawn from interviews with Hansen's end-user customers who were the first adopters of the company's new Anti-Corrosion-Technology for valve systems, this report gives an overview of the many factors that influence the specification of valve and pipe materials.

Key points: End users are focused on creating long-term value by streamlining maintenance with the best available technology.

- The array of new technology in the industrial refrigeration industry has led to changing attitudes towards maintenance. Rather than regarding it as a necessary operational reality, end-users are continually optimizing their approaches to finding new ways to eliminate recurring functions and make their maintenance plan a dynamic contributor to efficiency – rather than a built-in cost.

- The traditional approach to specifying piping and valve systems – painted carbon steel – is changing as end users search for a solution that can approach the lifetime reliability of stainless, but at a lower cost.

- As the labor shortage in industrial refrigeration worsens, facility managers are looking for new ways to free up existing personnel by eliminating maintenance functions requiring man-hours that could be used for higher-level tasks.

- The growing focus on visibility in facilities is pushing end-users to create ever more transparency when it comes to customer and regulator access to facilities. This need for transparency has translated to a growing demand for valve systems that eliminate all visible signs of oxidation.

- Changing operating environments such as rooftop and outdoor package installations as well as indoor sterile food production environments have created a demand for oxidation-free and highly resistant valve systems.

- Concerns about compromising the integrity of carbon steel pipe and valve systems to perform maintenance checks and assessments are making any technology that promises to function "hands-off" for useful life, an attractive choice for engineers.

A new attitude towards maintenance, particularly when it comes to the practice of maintaining painted carbon steel valves, has engineers transitioning from maintaining rust free environments – to eliminating oxidation altogether. This change corresponds with new decisions around piping.

I. Piping and Valves: The Industry is Considering New Materials and Approaches

The high price and limited availability of full stainless-steel pipe and valve systems is yet a barrier for the end users that were early adopters of Hansen's Anti-Corrosion Technology for valves. Nevertheless, several end users cited the need for a material approaching the reliability of stainless to realize their thresholds for the kind of efficiency that would yield long-term savings.

"We could do stainless, but that would be a very expensive investment," said one of Hansen's early ACT adopters. The company had been putting regular carbon steel valve stations into facilities and dealing with painting them over and over. "We were looking pretty closely at the stainless option, but that meant an investment in changing the entire system, and manufacturers just don't have a full line of valves available."

"Our industry is looking for something that has better longevity with less intrusive maintenance," he said. "Even if some corrosion with ACT valves eventually does occur, this solution gets us 90% of the way there and is a big percentage in cost savings as compared to other approaches."

3-Stage System Slows Oxidation

Hansen's ACT technology works in three stages. The first mechanism to control oxidation is zinc oxide, which produces light oxidation in the form of a dissolving white powder. The second and third, proprietary, layers of Hansen's three-part system are designed to slow and mitigate the oxidative process so that the actual valve is never touched. Altogether, the engineered goal, and tested outcome is that visible oxidation is prevented for ten to 15 years.

"This controlled process is almost like automating the traditional sanding and repainting process," said another ACT user. "The coating is capable of maintaining a great appearance to the end of its life, which is around the time of the end of the valve's useful life anyway. By syncing the time of first maintenance with the natural life of the equipment, you get an easy solution."

ACT Coating Automates Maintenance

While easy solutions are often not what they seem to be when it comes to engineering to eliminate problems like oxidation – in the case of ACT, said another user – looking at new materials and thinking creatively could result in long-term savings. "From a life-cost standpoint, ACT has advantages," he said. "We made the decision [to install ACT-coated valves] based on testing data from Hansen that showed this was a long-term if not lifetime benefit."

Many of Hansen's ACT adopters said they were representative of end users who were considering a variety of solutions to pipe and valve maintenance, including multiple plating options and powder coatings. One ACT adopter added that, particularly for smaller end users with limited resources and mounting pressure to maintain spotless facilities, ACT was the leading technology on the market because Hansen testing revealed minimal corrosion approaching a stainless environment – without the cost of stainless.

Across the board, the companies that chose to install Hansen ACT-coated valves said long-term ROI was a major factor in their decision. They cited cumulative maintenance savings and other indirect benefits, such as better utilization of staff resources as the primary motivator for eliminating maintenance related to oxidation.

II. Changing Attitudes Towards Maintenance: Efficiency is the Bottom Line

Moisture, frost, freeze and thaw cycles are a constant headache for refrigerated facilities with roof-placed equipment. Those cycles can do more than cause corrosion; they can pose a threat to the equipment over the long term, shortening useful life. And for facilities with equipment in indoor, sterile environments, as in food production – visible oxidation can do irreparable damage to the confidence customers and regulators place in an end user.

Over a ten-year period, a facility can incur significant cost managing oxidation. Eliminating maintenance was the common goal driving Hansen's early ACT-adopting customers.

Eliminating Redundant Maintenance Practices Yields Savings

Rather than choose a product with its own maintenance and replacement schedule, one Hansen end user looked for valves engineered to eliminate maintenance for their useful life. "Everything has a finite lifespan, and there are so many variables to consider when you plan the cost of maintenance for a facility. We're always looking as a company to do things in the most efficient possible way. Dollars on things that require maintenance are not well spent when you have the technology to solve the core problem. If you can engineer a solution once to avoid doing it over and over again, why not?" he said. The same end-user said his company projected that it would save around $5K per evaporator over the next ten years by eliminating repainting maintenance with Hansen's ACT coating.

"As a company, we're always looking for the most efficient way possible to do things, and when we find that best practice, it's something we stick with. Investing in good policy can save more money in the long run than saving on equipment that comes with a maintenance commitment," he said.

For companies that installed ACT-coated valves, a primary factor in their decision to specify ACT was the depth of Hansen test data, demonstrating a lifespan of ten to 15 years.

III. As New Technologies Evolve, End Users Look to Test Data

Any new technology or process adopted by a facility must ultimately stand the test of usability. That was one point underscored by all the companies that were early users of Hansen's ACT coating. Many cited that the relative ease of installing ACT coated valves – as compared to the comprehensive replacement of piping and valves that would be required for a shift to a stainless-steel system for example – was a factor in their decision to use ACT.

A low barrier to usability allowed facilities to test out the technology and determine how it would perform in their own operating environments. "It is very hard to approximate the benefits (and cost) of a full commitment to stainless right now," said one end user. "And there's not much information out there on alternatives to stainless, so we don't have good comparative information yet as an industry."

Another ACT user agreed, pointing out that there is also demand in the industrial refrigeration industry for a technology that can be easily implemented and measured, adding that: testing is one thing, but performance is another. "You use all the technical data available to get to the point of making the first purchase, and then you look at the data and see how it performs."

ACT Supported by Real-World Corrosion Testing

In developing data to project the lifespan of new ACT coated valves, Hansen relied on years of real-world valve testing to establish a baseline for corrosion, an industry first. “Corrosion is highly variable,” said Hansen Senior Innovation Engineer Butch Kuhn. "Smokestack gasses can accelerate it, facility washdowns if you are inside, outside temperatures, moisture and freezing cycles – all of these factors are different from location to location, and even in some cases depending on location at the facility, for example, different quadrants of a rooftop."

Hansen has compiled all these variables over 30 years of tracking and testing, on its own rooftops in the Midwest, and on customer rooftops in a variety of environments. “We have the data, and we have bellwethers, in the form of zinc-plated seal caps and gauge valves,” said Kuhn.

Hansen used its baseline on corrosion data to project useful life of the ACT coating by correlating it with results from salt spray testing. That was one reason many early ACT users were willing to adopt the technology, said Kuhn. “That decision wasn't just based on trust; it was based on data."

Using salt spray testing, Hansen was able to compare how ACT performed in an environment of accelerated corrosion compared to the real-world baseline. “Salt spray testing by itself doesn’t tell us anything unless we correlate it with real-world corrosion. Then we can look at real projections based on data,” said Kuhn.

With projections for valve lifespan reaching close to that of stainless, the end performance of ACT is set to prove a viable alternative, especially where cost and ease of use are concerned.

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