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CONVEYING NEWS BUILDING RELATIONSHIPS DEFINING CSI

CSI HAS THE SOLIDC PUMP YOU NEED WHEN YOU NEED IT

In 2003 Alfa Laval successfully launched the **SolidC** as the next generation of the reliable C Series pumps. With its advanced hygienic features, low vibration, convenient front-loading "one-seal-fits-all" design, and extended warranty, the **SolidC** pump has proven itself to be a strong competitor among standard duty pumps in the food, dairy, beverage, personal care, and light chemical industries.

Now CSI is building on that success by taking the availability of the **SolidC** range of pumps to the next level. We are pleased to announce our stocking and assembly program, which will drastically reduce lead times on virtually any pump unit in the **SolidC** range.

CSI is now stocking a large inventory of standard **SolidC** pumps covering each of the four pump models and has all of the most popular models in a variety of motor frame sizes available and ready for immediate shipment.

"Alfa Laval did its homework in developing this pump," said Mark Ruckman, Products Manager at CSI. "The **SolidC** brings excellent performance and cleanability. Now we are making it more accessible."

However, as we all know, pump applications can vary greatly. Therefore, in addition to stocking the standard pumps, CSI has also committed to maintaining a ready inventory of components, optional seal kits, service kits, flush seal conversion kits, leg assemblies, and electric motors in a wide range of horsepowers. This allows us to draw on a vast inventory to assemble virtually any configuration of complete **SolidC** pump and motor units for our customers by simply pulling the components from our shelves and assembling them to their specs. We can even trim the impeller diameter for any **SolidC** pump to meet any requirements with quick turnaround from our in-house machine shop. With this kind of flexibility, most **SolidC** pump and motor combinations can ship in just a day or two.

With this kind of flexibility, most SolidC pump and motor combinations can ship in just a day or two.

From computerized application and sizing expertise, to assembly and mounting services, crating and shipping, CSI's factory trained personnel assure that you'll get the **SolidC** pump you need – when you need it. Call **Dale Chambers** at **800.654.5635** for more information about how our **SolidC** stocking and assembly program can work for you.

What's Inside

IMPROVING SURFACE CHARACTERISTICS ON NICKEL ALLOYS THROUGH ELECTROPOLISHING

By R. Keith Raney

Electropolishing is the electrolytic removal of metal in a highly ionic solution by means of electrical potential and current.

A surface to be electropolished is made anodic (+) in a DC power circuit. The work is then exposed to an acid electrolyte (dipped or wetted). A cathode (-) is present adjacent to the portion of the work that requires electropolishing.

When the power is applied, an anodic film forms on the surface of the work and the material begins to be removed ion by ion. The effect on the microscopic surface is to smooth and level as the microscopic "peaks" dissolve more rapidly than the microscopic "valleys". Therefore, without dramatically changing a work piece dimensionally, the surface of the material becomes microscopically smooth and virtually featureless.

In these two photomicrographs, we see a typical sanded surface before (Figure 1) and after (Figure 2) electropolishing at a magnification of 1500X. When observed at normal magnification, the sanded surface appears clean and relatively smooth. The electropolished surface will be bright and much more reflective; however, depending on the technique of mechanical sanding/polishing used, the surface may still exhibit a "directional grain" pattern from the original sanding operation. In this example we see the effect on the microscopic surface of the material, which is much more dramatic than the same two surfaces when compared with no magnification.

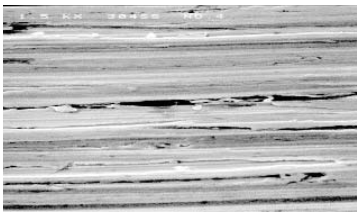

Figure 1: *sanded surface before electropolishing*

Figure 2: *sanded surface after electropolishing*

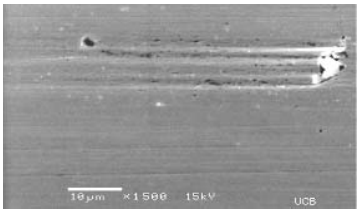

Figure 3: *embedded aluminum oxide*

The microscopic featureless surface (Figure 2) can only be produced by electropolishing. Any mechanical polishing process used, regardless of how fine the polishing abrasive media, will exhibit the same distorted surface features including torn, jagged, overlapped metal. In addition to the "damaged" metal surface, embedded residual materials (Figure 3) from the abrasive media used will remain as it is trapped within the features of the surface during the mechanical polishing operation.

Procedure

For a nickel alloy surface to benefit from electropolishing, the process must be allowed to continue for an adequate amount of time. The depth of the damaged layer will determine the amount of exposure time required. This damaged layer has been observed as deep as >.001" into the material when aggressive sanding techniques are used to meet a specific surface finish requirement. The damaged layer consists of not only the torn distorted material at the surface, but also deeper damage to the alloy itself due to manufacturing processes such as bending, forming, grinding, and sanding.

The depth of any damaged layer as well as the condition of the surface following other finishing operations should be considered when developing an electropolish procedure. If the end user wishes to achieve the desired benefits from electropolishing, a procedure should be developed and implemented to insure the process will completely remove any damaged layer from any critical metal surfaces.

Material removal in the electropolishing process is controlled by amp minutes per square inch (AMSI).

When 300 series stainless steel is electropolished at 100 amps per square foot for ten minutes, approximately .0005" will be removed.

(continued on page 3)

$$\frac{\textbf{100 amps x 10 minutes = 1000 amp minutes per square foot}}{\textbf{144 square inches per square foot}} = \textbf{7 AMSI}$$

About the Author: R. Keith Raney

Keith Raney is President & Owner of UltraClean Electropolish, Inc. in Houston, TX (www.ultra-cleanep.com). Keith has worked with electropolishing since 1975 and has developed many of the processes utilized in the industry. He supervises electropolishing equipment and materials for the semi-conductor, petrochemical, nuclear, automotive, aerospace, medical, and biopharmaceutical industries.

Founded by Keith in 2000, UltraClean specializes in on site or "in situ" electropolishing. Any equipment surface (accessible to the process) can be spot electropolished to match or exceed the factory finish. The equipment can be repaired, or completely electropolished on site, eliminating the need for very costly replacement.

Keith is a member of the ASME-BPE committee developing a specification for electropolishing 316L stainless steel equipment.

By multiplying the total number of square inches on a surface to be electropolished by 7 AMSI, the minimum exposure time to the process can be calculated, once the actual amperage that can be efficiently delivered to a work piece is known.

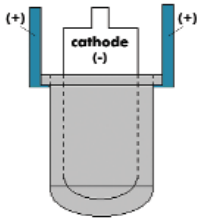

Figure 4: filter housing

Example: 316 stainless steel filter housing 12" diameter x 12" deep, with elliptical bottom head and open top. To electropolish the interior only the part would be fixtured (Figure 4) in such a way so that an adequate anodic (+) connection would be provided and an isolated cathode (-) would be suspended inside the housing. The efficiency of this fixturing would allow 300 amps to be delivered to the work piece once filled with electrolyte and the power applied.

In this example, the total electropolishing time of 15 minutes @ 300 amps will remove approximately .0005" of material from all exposed surfaces.

As we can see from this example, if we determine .0005" needs to be removed to assure optimum performance when the filter housing is placed into service, a procedure must be developed and implemented. If we control the electropolish process variables (temperature, chemistry) we can predictably and consistently repeat the process in the future.

Conclusion

Electropolishing is the best solution on specific materials used in the high purity industries for controlling the micro surface quality.

Properly performed electropolishing delivers:

- Removal of any damaged, work hardened, heat effected zone
- Removal of any embedded non-alloy material deposited during the manufacturing processes
- Microscopic featureless surface
- A very uniform passive layer which forms due to the micro smoothness and lack of peaks, valleys, raised grain boundaries, etc.

In industrial applications where optimum cleanability, sterility and low risk of product contamination/cross contamination are critical, properly applied electropolishing should always be considered.

$$\frac{\textbf{675 square inches x 7 AMSI = 4726 amp minutes required}}{\textbf{300 amps}} = \textbf{16 minutes}$$

Thank You

A big THANKS to all our customers who participated in a recent survey conducted by our marketing research company. Here at CSI, we strive to create and maintain the best relationships possible with our customers; and, the best way to get your feedback on how we are doing is to ask you. Periodically, we ask you to go online and complete an e-survey to rate your level of satisfaction with a recent purchase or request for service.

Then, about every two years we do a more in-depth study to measure and benchmark our own performance. This study takes about 20 minutes out of your busy day, but once the data have been collected and analyzed by the research folks, our own CSI team spends many hours discussing and determining how we can serve you better.

I would like to write a personal message to each person who participated in the random telephone interview. However, our research company guarantees confidentiality and anonymity; so, I do not know which customers participated. This brief message is my way of letting you know that we value your comments and will carefully evaluate your ratings and suggestions.

To say "thanks" is only the first step. We will go the extra mile to provide you with the best products and the best service in the most friendly and professional manner possible. We look forward to working with you for many years to come.

J. Mark Cook
President

Meet Sandra Mountjoy

Sandra Mountjoy plays a very important role at CSI as a Customer Service Assistant.

"First and foremost I am here to help our customers," said Sandra. She enters orders and makes sure they are shipped when customers need them. She also helps customers by quoting products and checking order status, freight information and tracking numbers. "A customer should call me whenever they have a question, no matter how big or small the problem may be."

Before coming to CSI, Sandra worked as a buyer specialist for ViaTech Publishing Solutions. She was responsible for selling, quoting and purchasing items for customer orders. Currently, she is working on an accounting degree through the DeVry Online College Degree Program.

CSI is pleased to have Sandra as a Customer Service Assistant. Give her a call today at **800.654.5635 ext. 153**.

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MEET BRYAN BILLMYER: DESIGN AND ESTIMATING MANAGER

Bryan Billmyer is the Manager of CSI's Design and Estimating Department. His department is responsible for mechanical design, construction detailing, cost estimating, project management, and customer service associated with CSI's fabricated equipment.

As the Design and Estimating Manager, Bryan oversees each project from start to finish. He supervises 13 employees including: project managers, designer/estimators, drafters, process engineers, a design administrator, and a sales engineer. He is responsible for all aspects and operations including the planning, direction and coordination of the design and estimating department. As a manager, Bryan also plays a role in developing corporate procedures and strategies at CSI.

Bryan began working at CSI in 1995 as a drafting intern while completing his Bachelor of Science in Mechanical Drafting and Design Technology from Missouri State University. During that time Bryan received accreditation as a Certified Designer from the American Drafting & Design Association. He then completed the Mini MBA program through the College of Business Administration at Missouri State University. Bryan is currently a member of these organizations:

- **ADDA** - American Drafting & Design Association
- **ISPE** - International Society of Pharmaceutical Engineers
- **SPED** - Society of Piping Engineers and Designers

- **ASME** - American Society of Mechanical Engineers, specifically the Bio-Processing Equipment (BPE) Standards Committee
  - Secretary of the SD (Design) sub-committee
  - Member of DT (Dimensions and Tolerances) sub-committee

Bryan also serves on the academic advisory council boards for Missouri State University and Central Missouri State University. Through establishing academic requirements for the degree programs in the technology/industrial/manufacturing industries, these committees help prepare future graduates with the knowledge needed to excel into the real world.

To learn more about CSI's design and fabrication capabilities, give Bryan a call at **800.654.5635 ext. 121**.