

Material Matters

to control the ferrite/austenite phase ratio and the partitioning of the alloying elements between the two phases.

An optimum range of nickel content is about 4 to 8% in a 25% Chromium duplex stainless steel. Increasing nickel content above this optimum increases the austenite ratio in such a way that the dilution of nitrogen in larger volumes of austenite would be detrimental and lowers its resistance to pitting and crevice corrosion.

Increasing the chromium content raises the pitting potential, and is beneficial in both phases. The trend in materials development seems to be towards moving from the 25% to 27% Chromium duplex alloys for increased corrosion resistance.

Molybdenum content well in excess of 3% is needed within a 25% Cr nitrogen enhanced duplex to be fully resistant to pitting and crevice corrosion in seawater. Molybdenum content cannot be increased indefinitely because of severe problems with intermetallic phase precipitation, and it rarely exceeds 4.5 to 5.0% in even the highest alloyed duplex stainless steels.

Summary and Recommendations

In summary, for seawater services the duplex alloy selected should have a balanced nitrogen enhanced composition to provide for a PREN greater than 38 or higher to ensure freedom from localized corrosion. Those duplex alloys that offer PREN values of 40 or more are ideal for pumps

and highly recommended for use in seawater.

An excellent way to specify any duplex alloy intended for seawater service would be to request that the chemical composition be balanced to provide a PREN greater than or equal to 40 as a minimum using the pitting resistance equivalent expression given above. This will ensure that the alloy selected has the optimum chemistry control to provide adequate localized corrosion resistance in the seawater environment.

Highly alloyed 25% Chromium duplex stainless alloys such as Goulds Code 1338 (Modified Cast Alloy CD4MCuN with 3% molybdenum), Goulds Code 1384 (ASTM A890 Grade 1C - CD3MCuN), or Goulds Code 1361 (ASTM A890 Grade 5A - CE3MN) are logical choices for sea water services. ■

References:

- (1) Bengt Walle'n, "Corrosion of Duplex Stainless Steels In Seawater," Avest Sheffield AB, Research and Development, acom 1-1998, SE-77480 Avesta, Sweden
- (2) ASTM A890, "Standard Specification for Castings, Iron-Chromium-Nickel-Molybdenum Corrosion - Resistant, Duplex (Austenitic-Ferritic) for General Application," Annual Book of ASTM Standards 2002, Volume 01.02.
- (3) Stephen Morrow, "Duplex Stainless Steels - Several Generations In The Making," PUMPLINES - Spring 2000 issue, ITT Industries- Industrial Products Group, Seneca Falls, NY

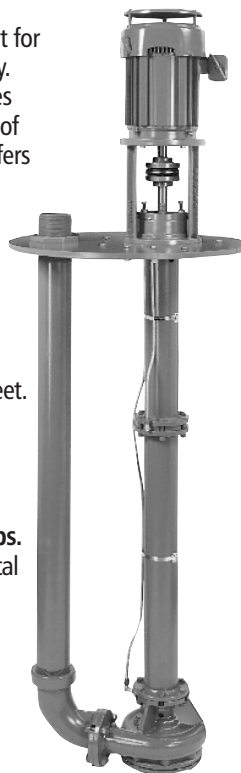
Sealless Vertical Sump Pump Provides Cost Efficient Operation

Looking for an alternative to maintenance intensive conventionally sealed sump pumps? Whether it's submersible, self priming, or foot valve equipped end suction pumps, they can be maintenance headaches.

The Goulds Model 3171 sealless vertical sump and process pump is capable of handling a multitude of industrial applications including process fluids, sump drainage, tank unloading, and chemical waste control. The sealless construction of the 3171 eliminates stuffing box problems, including expensive and maintenance intensive mechanical seals. Designed with a rugged, double-row thrust bearing, a heavy-duty one piece shaft that eliminates misalignment and provides for longer bearing life, the 3171 features an open impeller design which allows for external

impeller adjustment for maximum efficiency. Available in 17 sizes with a wide range of alloys, the 3171 offers capacities to 3180 GPM (722m³/h), heads to 344 feet (105m) and temperatures to 450° F (232°C). The 3171 handles lifts from 2 to 20 feet.

For additional information on the Model 3171 visit www.gouldspumps.com or call your local Goulds Sales Office. ■



Service Solutions

Innovation Reduces Refinery Costs

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Project Engineering PRO Services

Problem:

A major Oil Refinery on the Gulf Coast was spending several hundred thousand dollars per year to strip their tank farm vessels. The refinery was renting pumping systems on a regular basis to strip their tanks. The issue was the continual annual rental costs. They performed a complete assessment and found the costs of solvents and other cleaning fluids to be recurring with no corrective action available at this time. The cumulative cost of renting the systems was compared to the cost of owning a single system that would accommodate the needs of the tank farm with reasonable maintenance costs. It was assessed that the cost of a new system would be paid for in less than a year and the annual maintenance costs would be a small fraction of the rental costs.

Solution:

Through a continuous effort to reduce costs in their operations they found this opportunity and worked with ITT PRO Services Project Engineering Group to resolve the large annual expenditure issue. Utilizing CAD generated conceptual drawings the initial idea began to evolve. Through several meetings with the customer and PRO Services representatives, we were able to take the basic idea of a pump on a trailer with a driver and piping to a completely automated and self-contained system.

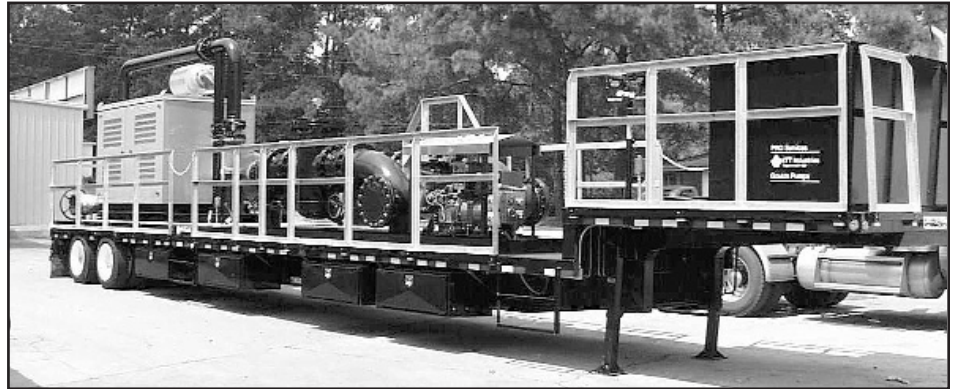
The system consists of a process pump capable of 2000 GPM, a 625 HP Diesel Engine driver, and a specially designed skid to completely isolate the pump system from the trailer for long term eventless operation due to alignment and torsional issues. The engine alone was a task as diesel engines are not made for CCW rotation. They are manufactured in CW rotation so an inverter was required to operate the pump in a CCW rotation. All the torsional loading on the skid and trailer had to be reviewed and designed for. The piping was designed using the latest piping design software and empirical information. Though this was an API application, we utilized stainless expansion joints to reduce the potential for pipe strain. The piping was supported throughout with

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Innovation...

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massive brackets tied directly to the deck of the trailer. The suction system incorporated dual 16" piping to allow for massive strainers to be cleaned without interrupting the functionality of the system. The diesel engine was able to run continuously for 24 hours with the 1000 gallon fuel tank which was incorporated in the front of the trailer. The fuel system was completely automated as was the control of the complete system through an electrical control center designed to allow the operator to stand in one location on the side of the trailer and operate all the separate systems as required. The entire trailer was lit by a separate diesel generator system that also received fuel from the 1000 gallon diesel tank.



The final testing of the system was done at our PRO Shop utilizing flexible piping and a 20,000 gallon portable water tank. After a successful witness of the performance test the customer accepted delivery of this great system. If you

would like to know more about this project or how you can lower your plant operation costs, please contact your local PRO Services Account Manager or PRO Service Center. ■

ITT ProCast Offers Pump Parts On-Line

ProCast, an ITT Industrial Products Group Company which manufactures OEM quality replacement parts for pumps and other industrial equipment, has developed a website simplifying the parts purchasing process. www.procastparts.com allows customers to search, identify, and order parts on the internet, anywhere, anytime! The new website features user-friendly navigation and simple shopping cart functionality. An extensive search catalog of all major pump manufacturers enables you to locate your part quickly. Additionally, procastparts.com allows credit card purchasing, online order status, and e-mail order confirmation.

ProCast has been supplying parts to industry for a quarter century. It has the resources, the technology, the personnel, and the proven experience to quickly and economically manufacture quality replacement parts for virtually any industrial rotating equipment.

ProCast has earned a reputation for providing high quality design, foundry and machining services, employing the very latest in technology. ProCast parts meet or exceed manufacturers' standards. Located in Zachary,

Louisiana, ProCast assures you the fastest possible response to your parts needs.

For more information visit our Website at www.procastparts.com ■



Send your comments or suggestions to:

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View the latest in pumping technology at: www.gouldspumps.com