

PumpLines

Innovation... Technology... Leadership

PumpSmart® Helps Scepter Inc. Toss High Energy and Repair Costs into the Recycling Bin

Ever wonder where all of those aluminum cans wind up? Over 100 billion aluminum cans are produced annually in the U.S.A. The aluminum can is the most recycled item in this country. Over 60% of them are recycled. Many of them find their way back to Scepter Inc.



Scepter Inc. of New Johnsonville, TN is a company that recycles scrap aluminum. It produces reprocessed, cast aluminum ingots that are used by beverage manufacturers in making aluminum cans for their products.

Two furnaces are utilized by the plant for melting the scrap aluminum. Each one is capable of processing thousands of cans. As the melted aluminum leaves the furnaces it is poured into the cast ingots. These ingots are then cooled down by water pumped from a cement pit and circulated back to a cooling tower. After the cooling liquid leaves the furnace area, the temperature of the liquid can reach over 200 °F.

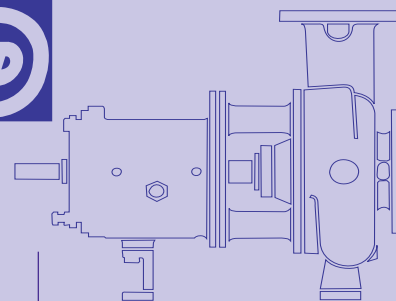
Scepter's problems started with the pump used to circulate the cooling liquid. It was a 6" 88 HP submersible pump which had its motor submerged in the pit. Keeping a constant flow of liquid to the furnace meant that the pump was working overtime. High cycle rates caused the pump to start and stop continually. This continuous starting and stopping caused the pump's motor to fail. The motor failure happened three times over a one-year period. The repairs cost Scepter between \$10,000 and \$13,000 for each breakdown. These costs were coupled with high-energy consumption from the old existing pump. Scepter faced some serious cost and downtime problems that were eating into the company's profits and productivity.

Wayne Keith, the plant manager of Scepter, was looking for solutions to help him eliminate the high energy and repair costs. He found help when Steve Green, a sales engineer for Tencarva Machinery Company of Nashville, TN called on him. Steve suggested replacing the old submersible pumping system with a Goulds 30 HP VIT model vertical turbine pump equipped with a PumpSmart PS200 unit, coupled with a liquid level controller. Steve explained how the PumpSmart PS200 could be the answer to the costly pumping problems that Scepter was experiencing. He went on to explain how PumpSmart could easily save Scepter at least 30% in energy savings alone.



PumpSmart PS200

continued on page 2



IN THIS ISSUE:

- Feature:**
PumpSmart® Helps Scepter Inc. Toss High Energy and Repair Costs into the Recycling BinPage 1
- Tech Talk:**
Self Priming Centrifugal Pumps: A PrimerPage 2
- NEW EDUCATIONAL INITIATIVE:** "Pump Systems Matter"[™]Page 4
- Material Matters:**
Steel Casting Design ConsiderationsPage 5
- New Products:**
API 610 9th edition fully compliant VS4 sump pump is now available.....Page 8
PumpSmart® Model PS200 v 4.0 Provides Enhanced Pump Control and ProtectionPage 8
Goulds Aids the Reconstruction Effort in IraqPage 8

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Goulds Pumps



PumpSmart Helps...

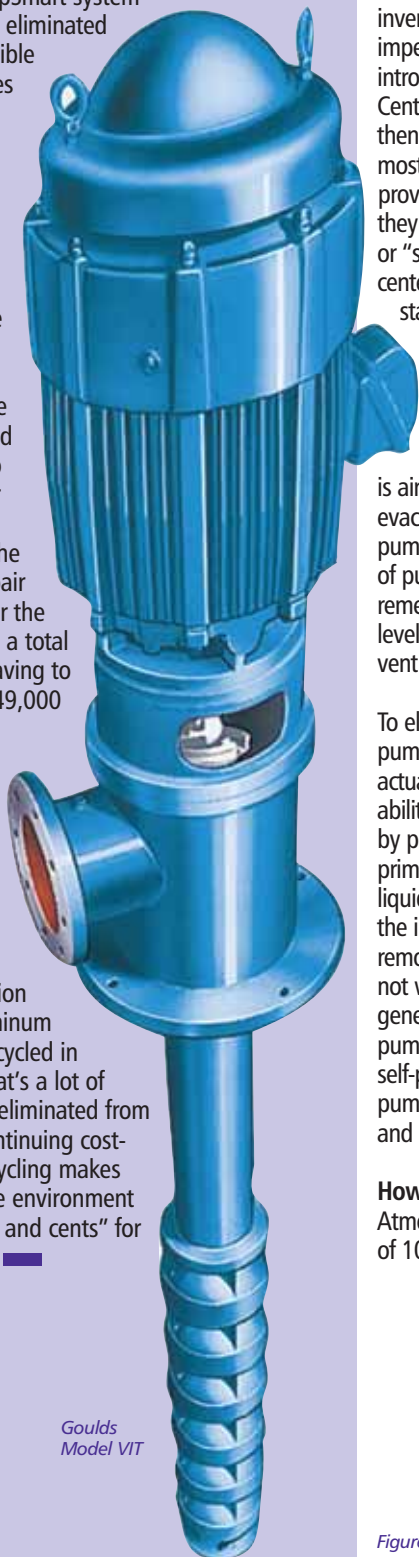
continued from page 1

PumpSmart's continuous monitoring and reaction to the pump performance conditions meant greater reliability and longer life.

Wayne was sold. The new PumpSmart PS200 system was installed. The VIT had a TEFC motor that was mounted on a structural steel frame 10 feet below grade. The new Goulds PumpSmart system immediately eliminated the submersible pump failures due to high temperature and continuous cycle rates.

What's more, by reducing the HP by 65%, savings in energy alone are estimated at \$7,000 to \$10,000 per year. It also eliminated the constant repair bills to repair the old motors-- a total estimated saving to Scepter is \$49,000 per year! PumpSmart certainly was the smart choice.

In the last thirty years, over 14 million tons of aluminum has been recycled in America. That's a lot of solid waste eliminated from landfills. Continuing cost-effective recycling makes sense for the environment and "dollars and cents" for the recycler. ■



Goulds
Model VIT

Tech Talk

Self Priming Centrifugal Pumps: A Primer

John Kanute

Application Engineer, Goulds Pumps

Centrifugal pumps can be traced back to the late 1600's, when Denis Papin, a French born inventor, experimented with straight vane impellers. British inventor John G. Appold introduced a curved vane impeller in 1851. Centrifugal pumps continued to evolve since then. Next to the electric motor, they are the most popular machines in the world. Pumps will provide satisfactory service to the user, assuming they are in a system offering a flooded suction or "suction head" (fluid is located above the centerline of the pump). The drawback of standard end suction centrifugal pumps is that they do not fare well when the liquid is below the pump centerline. Liquid must be delivered to the pump so the process can begin. The pump can not lift liquid vertically to begin the process. The reason is air in the suction side of the pump can not be evacuated from the casing. The centrifugal pump will become "air bound" and incapable of pumping any additional liquid. The only remedy for this situation is to raise the liquid level to the pump inlet and have the operator vent the suction line before starting.

To eliminate this problem, self-priming centrifugal pumps were developed. The term self-priming is actually an industry term that describes the ability of a pump to create a partial vacuum by purging air from the suction line. The self-priming pump unit uses an initial quantity of liquid (usually water) to create the vacuum at the impeller eye and continuously "digest" or remove air from the suction line. This benefit is not without cost. Self-priming pumps are, in general, slightly less efficient than an end suction pump. Marlow Pumps manufactured the first self-priming centrifugal pump in 1932. This pump design would go to the source and get liquid to be pumped.

How it works.

Atmospheric air exerts a pressure of 101.3 kPa (14.7 PSI) all around



Figure 1. Closed, Open and Semi-Open Impellers



Typical Self Priming Centrifugal on Industrial Sump Service

us. The pump creates a partial vacuum as it removes air from the suction line. The vacuum causes atmospheric pressure to push water up to the pump through the suction line. In a laboratory, with perfect vacuum, the atmospheric air would push liquid 10.3m (33.9 feet) up a column. The practical application limit for self-priming pumps is about 7.62m (26 feet) of liquid.

The self-priming process occurs automatically once the pump is started with the initial quantity of liquid. Without operator involvement, the pump can prime itself with the pumpage and begin pumping. If the vacuum is broken, the pump is able to reprime and continue pumping. The savings in time, effort and cost are substantial; especially in dewatering applications such as in mining where pumps often run dry for brief periods.

The advantages of using a self-priming pump are clear. It should be pointed out that numerous varieties of self-priming methods are in existence today. Most are related to the two methods that will be discussed now: diffuser priming and volute priming.

Volute Priming

Just as in a standard centrifugal, everything starts with the impeller.

There are three common impeller designs (Figure 1).

The Closed Impeller has shrouds on both sides of the vanes. It is a desirable design for higher pressures and clear liquids.

The Semi-Open Impeller has a shroud on one side of the vanes. It can handle a moderate amount of solids in the liquid.

The Open Impeller has the shroud cut back completely except where the vanes are located.

It can pass a high concentration of solids.