Zero-Lead Zone

By Brian Daschner

Water pumps, including submersible and vertical turbines, play an integral role in everyday life. Whether they pull water from a source to a treatment plant, add necessary chemicals to the water at the plant or help move the water from the plant to a tap, turbines work constantly to serve communities.

Assessing changes brought on by new movement

Every city has different needs in terms of their water systems and they all require different pumps. Important factors regarding type of pump include population, distance from the source or water plant and average water consumption. The size of turbines and the materials used in them vary based on those demands.

Since 2006, drinking water systems have been updated through various movements and initiatives. One of the most noteworthy is the Zero Lead Initiative. The federal government first passed the Safe Drinking Water Act in 1974 after warnings from experts about the dangerous effects of lead exposure. Fourteen years later, the act was amended by the Lead Contamination Control Act. This amendment stated that plumbing components must be "lead free"—which still allowed for up to 8% lead.

Recently, on the heels of completely lead-free movements in California and Vermont, Congress moved forward with a proposal to drastically reduce the amount of lead in drinking water systems. The new legislation mandated that the amount of lead in drinking water must be 0.25% or less. President Barack Obama signed this amendment into effect on Jan. 4, 2011, requiring that current pumps and pipes be completely updated within three years.

Pump and turbine manufacturers have already responded to these new requirements by changing the composition of pumps containing lead.

Vesconite is a specialized thermoplastic compound with internally lubricated polymers.

Hardly Worth Bronze

One common material that has been used in turbines and contains traces of lead is bronze, which—despite its past life span in wet, rigorous conditions—is quickly proving inefficient and troublesome. Today, before manufacturers cast bronze impellers and bearings, they remove all traces of lead in bronze and replace it with different alloys, such as zinc, tin or aluminum. While this enables the pumps to meet the reduced or no-lead requirements, it drastically hurts the life span of the pump. The new metals that replace lead are susceptible to the adverse effect of chlorine, a chemical included in drinking water to help kill and prevent the spread of bacteria.

Occasionally, a water system must be "shocked" with chlorine in order to kill bacteria or ensure safety if there is a failure somewhere throughout the line. In these instances, chlorine content can be as high as 10 to 15 parts per million (ppm), as opposed to the norm of 1 ppm. Bronze pump parts will not withstand that much chemical abuse for extended periods of time. Pump failure has been widespread when using bronze impellers and bearings that are exposed to chlorine, so instead of a water pump lasting 10 to 15 years, it will only last a few years at most. This causes multiple issues for cities and governments, such as pump failure, insufficient water flow and even water contamination.

A Better Metal

Manufacturers of these pumps typically only test their products in 1- or 2-ppm atmospheres to ensure quality. However, they will often not warranty pumps if the chlorine content surpasses 2 ppm, like in the aforementioned scenarios. At the same time, a few manufacturers are proactively approaching these concerns with a better metal: stainless steel.

Stainless steel is becoming a more popular choice in the pump industry. Stainless steel is inert to the chlorine, not affected like its bronze counterpart. In fact, stainless steel is completely lead free, so there is no need to replace lead with alloys. Additionally, it can handle more abrasion than bronze. Stainless steel pumps not only last longer, but they also save cities and governments time because they do not have to worry about early pump failure and replacements every other year. Rather, cities can focus more of their energy on other projects and upgrades.

Another innovative product that is making its way into the pump industry is Vesconite. Vesconite is a specialized thermoplastic compound that features internally lubricated polymers. Produced in South Africa, Vesconite has a lower coefficient of friction, is resistant to chemicals like chlorine, contains no lead and can even work in dry-start applications. It has also been proven to last 10 times longer than bronze bearings in abrasive applications.

The changing government standards for drinking water are for the benefit of each community. Although new regulations present challenges to the pump industry, innovations such as stainless steel turbines and Vesconite bearings ensure clean and safe drinking water. *wqp*

Brian Daschner is president of Hydroflo Pumps. Daschner can be reached at bdhydroflopumps@yahoo.com or 615.799.9662.

For more information on this subject write in 1003 on the reader service card or visit www.wqpmag.com/lm.cfm/wq041103.