CASE STUDY

Custom Chiller Satisfies Temperature Control in Chemical Synthesis Reactor.

Pfannenberg fits chiller into confined space within a packaged Ferrator® targeted for water and wastewater treatment in third world countries.

The "Packaged Ferrator®" overcomes the obstacles and high cost of using Ferrate, a highly potent oxidizing disinfectant for water and wastewater treatment.

The portable Ferrate sythesis system is a game changer for delivering effective treatment for remote locations in underdeveloped nations.

In their quest to develop an affordable Ferrate synthesis system, Ferrate Treatment Technologies, LLC of Orlando turned to Pfannenberg for help with developing a liquid cooling solution for a small, cabinet-based system.

While already using Pfannenberg chillers for larger, trailer-based Ferrate synthesis systems, no standard packaged chiller was capable of integrating seamlessly within the concept of the self-contained cabinet-based Ferrator system.

SHARING COMPETENCE

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

The treatment or “cleansing” of water takes on two primary requirements – eliminating contamination within acquired water prior to using or drinking (potable water); and eliminating contamination within used water prior to its release back to the environment (waste water). For both requirements, an element of cleansing involves disinfection which can be accomplished by several methods intended to kill, remove, or oxidize the contamination. Techniques include mechanical separation such as filtering and reverse osmosis; exposure to ultraviolet light and radiation; and the addition of chemicals such as chlorine or ozone, and now Ferrate. Each technique has its own advantages, disadvantages, effective cost ratio, and ability to scale up in order to treat the affected volume of water.

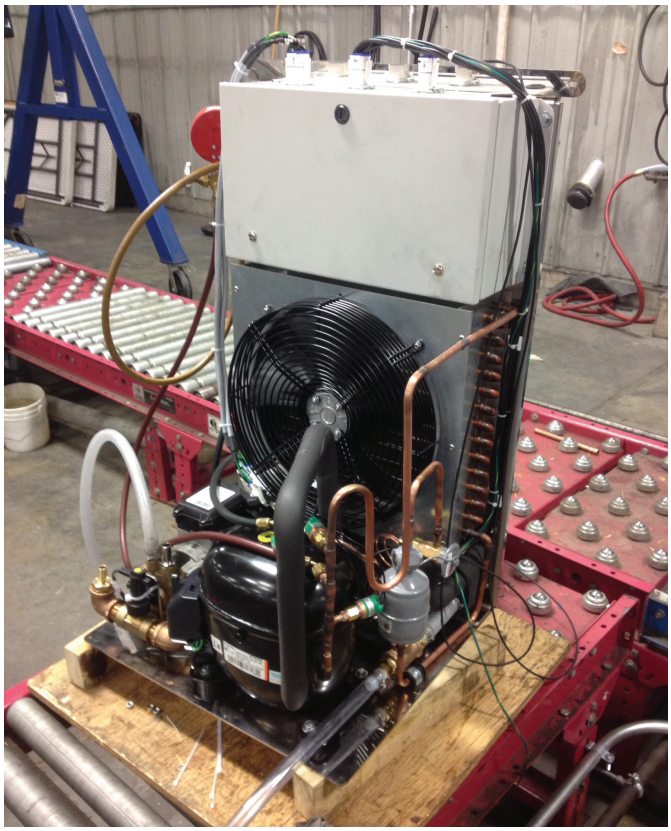
Oxidation is a process which causes chemical decomposition as well as breakdown of both organic and non-organic substances and is vital for the removal of contamination from water. As a chemical additive, Ferrate possesses extraordinary oxidation capabilities, however, it has historically been quite expensive to manufacture, which has limited its use primarily to laboratory research applications. Attempts to produce economical and commercially viable quantities of Ferrate had seen limited success until Ferrate Treatment Technologies, LLC of Orlando (FTT) changed the game by creating a streamlined synthesis process and point-of-use production device. By eliminating storage, handling, and transportation costs associated with a pre-packaged product, FTT has cut Ferrate deployment costs by more than 85%.

Pfannenberg chillers on trailer-mounted Ferrator.

Pfannenberg CC 6301 chiller in a rack-mount Ferrator prototype.

The breakthrough device is called a Ferrator, initially available as a trailer or skid mounted system with various capacities targeted for water treatment applications in rural areas. The Ferrator is suitable for a variety of applications including municipal wastewater, industrial wastewater, drinking water, ship ballast water, and environmental water restoration. Ferrate is highly effective for oxidation, disinfection, coagulation, de-watering, and deodorizing. Ferrate treatment removes phosphates and heavy metals; kills spores, bacteria, viruses and protozoa; removes colors and odors; and its by products are non-toxic.

The Ferrator synthesizes Ferrate on-site from three raw ingredients: iron, bleach, and caustic, which are pumped to a homogenizer and reaction chamber. The final product is a liquid which is stored in a tank. Both the reaction and storage areas require cooling, which is provided by Pfannenberg chillers.



Pfannenberg open-frame chiller on factory production line.

Pfannenberg open-frame chiller inside packaged Ferrator.

When FTT encountered problems with chillers from another manufacturer they contacted Pfannenberg to provide EB 150 chillers for skid-based systems. Due to their successful experience with Pfannenberg chillers for these applications, FTT turned to Pfannenberg once again for assistance with a project they had to fit a smaller scale Ferrator system into an enclosure. Initially, a CC 6301 packaged chiller was used successfully; however, new design criteria required further miniaturization and this standard packaged chiller would no longer fit. The Pfannenberg engineering team went to work on designing, building, and delivering and open frame chiller based on the CC 6301 that could fit within the confines of the small Ferrator enclosure.

" Without Pfannenberg's cooperation, full support and timely expertise, FTT could never have achieved this historic build for a major philanthropic foundation that is committed to improving the lives of impoverished people in developing countries."

-Luke Daly, CEO
Ferrate Treatment Technologies, LLC

Luke Daly, CEO of Ferrate Treatment Technologies, LLC with the packaged Ferrator system

The small scale Ferrator is targeted for use in third world areas for the treatment of human wastewater and drinking water. Here, the efficiency of the self-contained system will permit water purification in remote areas in which there are no sewer systems, water distribution systems, or central water treatment facilities. The small size of the Ferrator permits it to be readily transported to such remote areas and even be used as a portable device for use at multiple locations. The goal is not only to reduce the adverse effects of discharging untreated wastewater to the environment, but also improve human health by reducing contamination in water available for drinking.

Summary

Water is a vital resource with an ever-increasing demand due to pressure from human expansion, activity, and population increase. Clean water is a necessity for both human health and environmental sustainability. With a limited supply to that found on earth, man must utilize and develop ways to protect and ensure the availability of clean water.

Newer technologies involving reverse osmosis for desalination will increase the fresh water supply derived from the seas while improvements in disinfection technologies will be vital for recycling and conservation of rainfall-dependent fresh water derived from lakes, rivers, and wells. Automated controls, pumps, and chemical reactions utilized in these efforts can all be protected by products from Pfannenberg.

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