Total Dissolved Solids Filtration System
Nick Aiello, Alejandro Del Castillo, Brian Milner, Alex Smith
Sponsored by Zodiac Pools

The Team
Team Pool Boys
From left to right:
Alex Smith, Brian Milner, Nick Aiello, Alejandro Del Castillo

Problem Statement
Over time, calcium builds up in the pipes and on the walls of a saltwater pool, which can damage the pool system or the pool itself. Currently, the only way to remove this calcium buildup is draining the pool and manually scrubbing it off. Our task is to develop a filtration system that can be integrated into a pool system in order to remove calcium from saltwater pools as water cycles in the system.

Project Overview
TAC media is a new technology previously used for home water softeners. We have leveraged the ability of the TAC to crystallize calcium into calcium carbonate, a much larger compound which can be filtered out much easier.

When water flows through the first level, it flows by the TAC media, crystallizing calcium ions until the calcium crystals get too large and break off. After the crystal exits the housing, it is blocked by the 10 μm nylon filter located in the vertical T section, preventing the calcium from leaving our system. Water will continue to flow through the system with the calcium now blocked. Once flow through level one is diverted to level two, the calcium will fall to the bottom of the extended pipe in the bottom right of the system where a cap may be removed in order to clean our all the calcium precipitated and suspended in the system.

Fabrication
This system utilizes mostly PVC piping as well as custom parts made of Thermelyne designed by the team and manufactured by Zodiac Pools. Most parts are connected by JB weld to ensure a secure and water tight seal. A requirement given to the team was for the total cost to be under $300, which the team achieved using relatively low cost parts and materials.

Future Work
The team would like to continue testing the effectiveness of the TAC and calcium removal under a wide variety of conditions that would be seen in the pool. Additionally, the final step would be implementing the filter into an actual pool system, and then running tests in real conditions.

Summary
The team was tasked with creating a pool filter to remove calcium from pool water and decided to use TAC media to assist in removal of calcium, and then developed a filter to capture the crystallized calcium while still allowing water flow through the system. Although the team was unable to finish the project, testing of the filter yielded very promising results.

Results
![Testing Date vs. Dissolved Calcium (ppm)]

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