

## Personal Ultrasonic Golf Club Cleaner

**Sponsor:** David Hein of Nexen Group

**Sponsor's General Mission or Business Statement:** This is an entrepreneurial exercise, with the goal of bringing this product to market. The experiences of the project principals range from telecommunications, power transmission, linear and rotary motion control, and construction industries.

**Sponsor's Advisor, Title, and Phone Number:** David W. Hein, Vice President of Engineering at Nexen Group, Inc. 1-651-335-9550; Paul W. Hein, Director of Engineering at Fortec, Inc. (Retired), 1-262-786-1640

**Sponsor's Address:** 560 Oak Grove Parkway, Vadnais Heights, Minnesota 55127

**University of St. Thomas School of Engineering Academic Advisor:** Dr. Michael P. Hennessey

**Team Member Names:** Andrew M. Casey (ME), Eve N. Commerford (ME), Jason D. Menken (EE), Joel M. Szczepanski (EE)

**Senior Design Clinic I-II (ENGR 480-1) 2007-8 Project Mission Statement:** Design a commercialized golf club cleaner using ultrasonic technology providing a quick and easy way to clean two golf clubs simultaneously. The club face and grooves must be cleaned effectively and in a safe manner considering the ANSI and EU safety requirements while keeping the finish of the club intact.

### Major Design Requirements:

1. Clean golf club using ultrasonic technology.
2. User friendly with commercial appeal.
3. Safe design using non hazardous cleaning solution.
4. Maintain integrity of the golf club.
5. Power requirements of 120 Volts and 60 Hz.
6. Adjustable cleaning intensity with self timing and automatic shut off.
7. Low cost per 1000 piece production.

**Senior Design Project Summary:** This project required a design focused multidisciplinary engineering team in the creation of an automatic golf club cleaning system. Ultrasonics is a technology already being used to clean medical devices, tools, jewelry, etc. Using this proven technology, the product will be the first of its kind to be marketed for personal home use; currently there is no automated home consumer based golf club cleaners. The design of the unit must balance affordability and performance resulting in a product that is effective and easy to use. A detailed development phase was implemented where mechanical and electrical components were chosen in accordance with customer requirements. Electrically, a generator was designed to run at 40 kHz and 70 Watts. This frequency and power are based on the size of the tank and typical golf club composition. Mechanically, the product requires a user friendly, aesthetically pleasing, two club hold design. A seal around the rim of the tank is used to isolate the electronics from the liquid and concentrate ultrasonic vibrations on the tank.



Figure 1 – First prototype

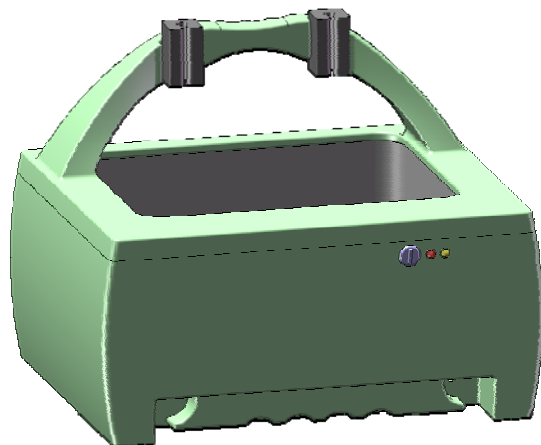


Figure 2 – 3D drawing of assembled product