

## U.S. Firm Succeeds With Pool-Cleaning Device Using TPE

**C**leaning outdoor pools and hot tubs is not an enviable task, but through a combination of design refinements and savvy material specification, SWS Corp., Bozeman, MT, developed a product that makes the job easier for recreational pool and tub owners.

Developed by Michael Stoner, a hydraulics engineer and president of SWS, the Grit-Gitter is a handheld underwater vacuum. Squeezing and releasing its bulb sucks in water and debris. A screen and check-valve trap the debris as the water flows back out. Using hydraulics principles, it can draw sand, particles, and other debris out of the tight corners, flat surfaces, and filter compartments of hot tubs and pools.

The product, which can be used while a person is inside the tub, is less bulky than competing devices and can remove debris with just a few squeezes, the company notes.

Finding the right combination of materials for the product during its development proved difficult. Ron Perina of injection molder Quake Industries Inc., Belgrade, MT, which molds the device, referred Stoner to product designer Brad Wright of Salient Technologies, also in Bozeman. The three parties collaborated on the design of the Grit-Gitter.

Wright was a strong proponent of thermoplastic elastomers, due to their ease of processing, colorability, soft feel, and longevity. But it remained to

be seen how well TPE would mold into a bulb shape and provide the desired mechanical qualities. The bulb stretches over a rigid high-density polyethylene ring that attaches the bulb to the rigid parts of the vacuum device.

Overmolding proved impractical, so Stoner ran a series of stress tests in his shop by using a range of TPES from GLS Corp.,

they produced just a suction of 0.9 psi.

After consulting with GLS, Stoner and Wright made engineering adjustments to thicken the bulb in critical areas. In the second test, run with a strategically thickened bulb, the device produced 1.5 psi of vacuum, more than enough for the product to operate. In fact, with the modified design, the bulb produces 0.015 hp.

The Dynaflex G2755 translucent TPE grade, with a 51 Shore A hardness, was chosen to make the blue-colored bulb because it offered the best combination of suction power, resiliency, and grip to HDPE, SWS explains. The grade also offered excellent colorability and a grippy, rubbery feel to the user, in addition to the necessary chemical and UV resistance for an outdoor, chlorinated water environment.

The yellow nozzles and screen gaskets are made from Dynaflex G7980 (80 Shore A hardness), a high-performance grade. The TPE is said to be easily colorable, and formulated to impart a smooth finish and high-quality look for added consumer appeal.

After refining the design, the product went into production and distribution, retailing at \$30. "We haven't had even one Grit-Gitter returned due to

a broken or worn-out bulb," notes Stoner.



**The Grit-Gitter**, a pool and hot-tub cleaning device that sucks in and traps debris, is made of various grades of TPE from GLS.

McHenry, IL. Testing determined that the product's dimensions should stretch a 2.1-in bulb over a 2.3-in HDPE ring.

The molds and tooling, supplied by Steel Reality Inc., Kalispell, MT, were set up at Quake Industries for testing. Initial runs of the bulb mold tested different grades and Shore A hardnesses of GLS's Dynaflex-G and other TPE materials. These bulbs proved inadequate, as



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