

CAP Access Covers Test to New Levels of Resistance from Above and Below



A new generation of utility access covers developed by Composite Access Products (CAP) demonstrate twice the deflection resistance required by industry standards. Designated CAP ONE, the 41-inch (104.14 mm) diameter cover achieves what was once considered unachievable in formulations transfer molding (RTM) – complete formulations wetting throughout a dense glass fiber loading for a 2-inch-thick (50.8 mm) part.

The achievement was led by CAP President Chad Nunnery, who assembled a team of resources from different fields of expertise to make the next-generation access cover a reality at its McAllen, TX, manufacturing facility. For product formulations and molding process support, Nunnery turned to world leader AOC Formulations.

“Daniel Rodriguez and Rob Koehler with AOC helped us successfully make such a thick and strong part,” Nunnery said. “In addition to nailing the correct process parameters, mold configurations, and equipment settings, AOC was critical with basic training and knowledge on other productivity ideas with the process itself.”



The resin for the application is a Vipel® unsaturated isophthalic -NPG polyester. The resin provides superior resistance to corrosion and is engineered to provide complete wetting of the high-density glass fiber reinforcement inside the cavity formed when mold halves are clamped together. The process results in the precise reproduction of the features designed into the mold halves.

Withstanding the test of time and time again

A testament of the value of the CAP partnership with AOC are the results of tests performed on the cover by The University of Texas Rio Grande Valley's mechanical engineering department. The test facility performed 500,000 cycles of high fatigue loads with 40,000 pounds for the majority number of hits -- twice the amount of force indicated for existing standards. After cyclic loading, the facility performed Proof Load tests following AASHTO M 306 standard protocols. The test concentrates 50,000 pounds of force on a 9-inch by 9-inch (22.86 cm by 22.86 cm) metal plate centered on the cover for one minute. After the force is released, the cover is measured for "permanent" deformation.

The summary report noted that CAP ONE registered zero permanent deformation, and a careful inspection of the test cover showed no signs of cracking. Perhaps more notably, the video of the testing showed almost zero deflection while the 50,000 lbs was applied – before the force was released from the cover. Though not part of a US iron standard this is calculated internationally for composite manhole cover standards. Other US composite options have shown as much as 2.5 to 3 inches of deflection under load.



Precision-molded for an excellent seal

In addition to enhancing CAP ONE strength properties, the Vipel® resin's ability to provide complete mold fill ensures precise reproduction of part features designed to resist leaking.

To document watertight properties, a CAP ONE cover was sent to Louisiana Tech University's Trenchless Technology center.

After being submerged overnight under several inches of water, the only seepage that occurred were two drops. With the published standard for testing access cover assembly watertightness allowing for 0.1 gallon per minute, the tested CAP ONE measured 0.00 gallons per minute. For both the load force and watertight tests, the CAP ONE was assembled with composite frames that CAP compression molds with bulk molding compound.

Cost and performance superiority

Because CAP covers meet or exceed strength requirements at approximately half the weight of iron, they are easier and safer to install. The composite covers also discourage thieves looking for metals to sell to scrap yards, are transparent to data transmission and provide insulation against electrical and thermal conductivity. The covers can be produced in different colors and logos, warnings and other information can integrally molded into the surface.