



## Case History

**The Challenge:** A general contractor was required to install a buried sump in a process line. The liquid in and out of the sump was expected to be highly corrosive, with the potential for corrosive fumes. The project engineer wanted the sump to be covered, with access for testing and observation. The maximum temperatures in the sump could reach over 200° F.

The request started as a FRP 12" diameter manhole cover. Then a 12" diameter FRP support ring for casting into the concrete was added.

After additional "reflection" by the project engineer the decision was made that the entire top of the sump needed to be made accessible. The project scope was changed to a 36" x 36" square high temperature all FRP manhole cover; with mating supporting 36" x 36" inside dimension FRP composite support ring for casting into the concrete.



The requirement was added that the 36" x 36" manway cover would also have to take H- 20 live load (32,000 lbs.). At the same time the FRP cover would be required to handle the 200° design temperature on the bottom of the cover. The temperature on the top of FRP cover would need to be less than 140° - so that no one would be burned if they stepped or fell on the cover.

**The Solution:** The 36" square FRP composite manhole cover was designed using the WebCore structural panel technology. This technology uses sandwich panel construction with FRP composite skins top and bottom. By resin transfer molding infusion (RTM) fiberglass reinforced I-Beams are intricately molded tying the two skins together. This type of



fabrication provides an extremely strong sandwich panel; with enough thickness strength to handle both the highway traffic load and the high temperatures.

The FRP composite support ring had a unique design that provides a top lip, a seat for the sump cover, as well as a bottom outward turning flange that helps lock the ring into the concrete.

The structural core panel sump cover has a total thickness of 3-3/4". Yet, with a total surface area of 9 sq.ft. - the FRP composite cover only weighs 90 lbs. This light weight cover is only a fraction of the weight of a cast iron cover - which makes it easy to remove when needed. To make it even easier to remove, the FRP composite cover was provided with 2 threaded flush mounted inserts, and two matching threaded eye bolts.



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