

# High-Performance Engineered Light Housing



On February 4, 2018, all eyes turned to U.S. Bank Stadium, the location of Super Bowl LII. The stadium, which is the home of the Minnesota Vikings, also hosts a wide range of national and international events throughout the year. With its see-through roof and angular design, many people believe the 1.75 million-square-foot venue resembles a Viking warship. Highly recognizable in the Minneapolis landscape, the structure represents a new era in stadium construction.

## **CHALLENGE**

Among the countless visitors and television viewers who witnessed this spectacle of sports, very few paid attention to the lighting that made it possible. The stadium is outfitted with lights from Ephesus Lighting, makers of high-performance LED lighting solutions. MES, a full-service provider of global manufacturing and supply chain services, provides engineering solutions for companies such as Ephesus Lighting, a division of Eaton.

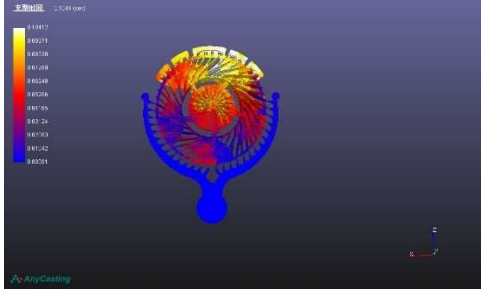
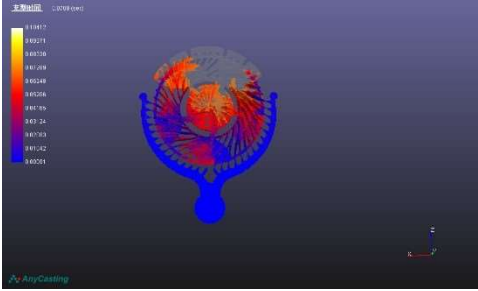
In this particular case, engineers had conceived a high-performance housing requiring extensive ribs for thermal conductivity. The component had to have very low porosity, which would be measured by performing leak testing on the finished assembly. It also had a combination of cored and machined holes for assembly. Finally, the component was large and heavy enough that it had to be cast in a 2,000-ton or larger press.

Definitely one of the most important requirements was that of porosity. During the die-casting process, air pockets can form and get trapped in the layers of the aluminum, creating a condition known as porosity. Porosity was not acceptable for this application as trapped moisture in the porous component causes a build-up of condensation, which can result in an electrical shortage. It would be tough to justify a lighting issue during important events like the Super Bowl!

## **SOLUTION**

Several tooling changes were put into practice to improve the material flow and eliminate porosity concerns. MES conducted Mold Flow analysis to ensure good tooling layout, runner and gate design. Mold Flow software helps companies reduce the tooling tryout times by designing the tooling correctly at the start. MES engineers implemented a host of design changes to improve

and add more venting, making it possible for the air to escape faster. They also used a runner system to change the way materials move through the tool. In this case, the material follows pre-cut patterns that allow it to flow quickly while also maintaining an equal temperature.



The versatile design and development of MES tooling and machining processes make it possible to adapt to any customer request, including changes to a cast part. This approach helps to ensure that every light is customized to a specific architectural vision. Once a plan has been established, MES supplies the nuts-and-bolts functionality that puts it all together.

**OUTCOME**

Tooling modifications were completed, and a machine process was established to eliminate surface porosity after machining. MES used the Pressure Test Unit Model C20 Sentinel to establish and implement leak test parameters. The company is prepared to perform leak testing in future projects that have similar requirements.

Feedback from Super Bowl LII, from the game to the half-time show, confirmed that the lighting performance was outstanding. This positive response is a testament to the superior lighting capabilities that Ephesus Lighting designed and developed for the stadium. MES played a small but highly significant part in the process by providing an engineering solution that eliminated any issues related to porosity.



MES provides engineering services, including global manufacturing resources and supply chain management, to a wide range of industries throughout the world. In addition to its headquarters in Lewis Center, Ohio, the award-winning company has locations in Mexico, China, India, Japan, Vietnam and Poland (Euro Metrics Sp. z o.o.).