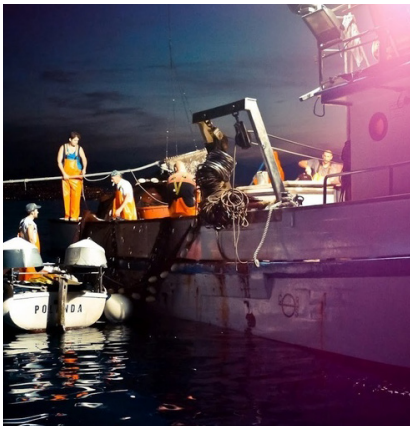
GORE® Protective Vents
Case History

HALOGEN LAMP WITHSTANDS EXTREME WEATHER CONDITIONS ON DECK

Together, improving life

Situation

Floodlights used on ships such as fishing trawlers, container ships, pilot boats and ferries must be able to withstand particularly rough weather conditions. The FL42 halogen lamp developed by WE-EF is used by ship equipment suppliers around the world to provide ondeck lighting that can cope with temperatures as low as -40 °C. Since halogen lamps are inexpensive, reliable and easy to maintain, they remain a popular choice for this particular application. Standardized halogen lamps are available worldwide as replacement parts and have a shorter ignition time than other lighting technologies. In addition, any ice that builds up on them dissipates very quickly, and they can be used to illuminate ships even when outside temperatures are extremely cold.

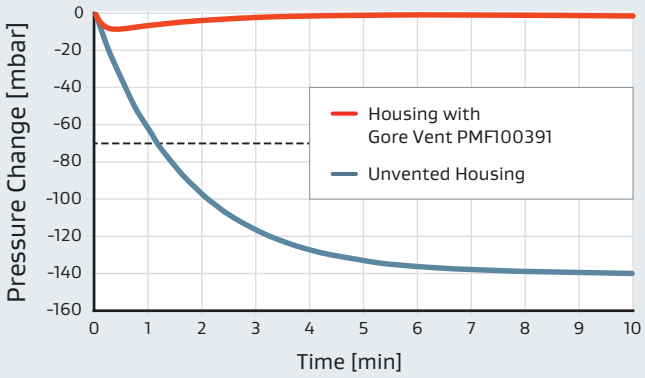


Challenge

Halogen lamps are a lot less efficient than their LED-technology counterparts, converting up to 95 % of the energy they consume into heat. At an ambient temperature of -40 °C, halogen luminaire housings can reach temperatures of up to 60 °C. The hotter the lamp gets, the more the air inside its housing expands, and the greater the internal pressure that causes air to escape through the seal. As soon as the lamp is switched off, the air cools – rapidly in some cases, depending on the outside temperature. This temperature change causes a vacuum inside the luminaire housing. This pressure can easily reach values of up to -160 mbar, which is enough to prevent maintenance technicians from being able to open the luminaire by hand. The vacuum also sucks air and moisture into the housing through the seal. Over time, seals become so fatigued that they let water, dust and other particulates in, which can lead to corrosion that can destroy the socket of the floodlight. “We received several complaints, and were faced with having to decide between discontinuing the product line and modernizing the technology to make it state of the art,” says Peter Oetjens, Head of Engineering at WE-EF. “Given the great success of the vents we’ve integrated into all our newer products, selecting a venting membrane made by Gore was the obvious next step for us.”

> “Gore’s venting solution not only ensures the longevity of the halogen lamp, but is also the key to continuing our floodlight business.“
>
> – Thomas Müller, General Sales Manager WE-EF

Housing Pressure Change Over Time



Even at outside temperatures of -40 °C, the FL42 lamp heats up to +60 °C. After it is switched off, the lamp cools down to +5 °C in the space of 10 minutes. In a vented housing, this causes no pressure differential because the vent allows the pressure to equalize easily. Without a vent, the housing is subjected to a negative pressure of some -160 mbar, which causes dirt and moisture to be sucked in via the seal.

GORE® Protective Vents are available in many different sizes and designs and can be easily integrated into new or existing design structures. The screw-in PolyVent M12 x 1.5 HA reliably protects the FL42 halogen lamp made by WE-EF from the most adverse weather conditions and temperature differences.

Solution

The vent had to be easy to integrate into the existing luminaire design and able to permanently withstand the large temperature differences and extreme weather conditions to which the luminaire would be subjected. A glue-bonded structure was ruled out since the existing luminaire design would not protect it from the elements, allowing hail and other environmental conditions to quickly destroy the membrane. “GORE® Screw-in Vents provide a much more reliable solution in cases such as this because the sensitive ePTFE membrane is permanently protected by the polyamide housing. So Gore’s solution offers us the ideal blend of cost efficiency and robustness to meet our requirements for this application,” says Peter Oetjens. “We didn’t consider using products made by anyone else because, given the specified flow rates, differential-pressure data and IP classes, we felt there was too great a risk that the existing problem would not be solved. But we’d already had very good results using GORE® Screw-in Vents in other exterior luminaires.” How the membrane is attached is a crucial factor in the product’s success. “The Gore membrane is attached inside the polyamide housing in such a way that it cannot detach,” explains Peter Oetjens. “We’re very satisfied with this pressure equalization solution, and we haven’t received any more product returns.”

Diverse Product Line Engineered for Simple Integration

GORE® Protective Vents are manufactured in many different sizes and shapes, making it easy to choose the right vent for any application. These vents are easy to integrate into new or existing designs to meet the needs of a broad range of applications and markets. For example, these vents:

- Tolerate temperatures ranging from -40 °C to 125 °C
- Perform to protection standards up to IP69K
- Provide maximum protection for applications in harsh environments through molded plastic or metal vents
- Install easily by being adhered, threaded, snapped or welded to a variety of enclosure materials

About Gore

W. L. Gore & Associates is a global materials science company dedicated to transforming industries and improving lives. Since 1958, Gore has solved complex technical challenges in demanding environments — from outer space to the world's highest peaks to the inner workings of the human body. With more than 11,000 Associates and a strong, team-oriented culture, Gore generates annual revenues of $3.8 billion.

Gore develops products and technologies that address complex product and process challenges in a variety of markets and industries, including aerospace, automotive, pharmaceutical, mobile electronics and more. Through close collaboration with industry leaders across the globe, Gore enables customers to design their products and processes to be safer, cleaner, more productive, reliable, durable and efficient across a wide range of demanding environments.

Learn more at gore.com/protectivevents.

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