

**SCHOTT**  
glass made of ideas

## Neuschwanstein Castle

Project report



## AMIRAN® Heritage Protect: Invisibly shielding lead glass windows in the famous Singers' Hall

Using the specialty glass achieves low-reflection clear visibility as well as reliable protection against environmental factors.

### Background

In 1886, Neuschwanstein Castle, built by King Ludwig II, was opened to the public. The famous building is today one of the most visited castles and palaces in Europe. Around 1.4 million people come to “the castle of the fairy-tale king” every year. In summer, an average of more than 6,000 visitors a day marvel at its rooms. The Singers' Hall was one of the king's favorite projects and, after the Throne Hall, the most important room in the castle. It spans the entire fourth floor.

### The challenge

The passage of time and millions of visitors have left their mark on the ceremonial room and made extensive restoration necessary. The historical lead glass windows are over 130 years old and are exposed to dust and dirt from the inside as well as to extreme weather conditions and UV radiation from the outside. The lead glazing needed secure protection, but also to be kept optimally in view for visitors.

### The solution

The solution was provided by the glass specialist SCHOTT with an anti-reflective protective glazing for historical facades that is specially adapted to unfavorable viewing angles. The robust and weather-resistant coating of AMIRAN® Heritage Protect was installed externally to shield the precious original lead glass windows from damaging environmental influences.

Its optical properties also ensure a clear view. A “hard coating” minimizes reflections ensuring visibility for the lead glazing behind it. The charm of the historic windows can continue to be enjoyed from any angle by the millions of visitors. The protective glazing placed externally in front of the historic glazing is 2 x 5 mm laminated safety glass with a 0.76 mm PVB film. The glass is back-ventilated and held in place by



The white framed windows are glazed with SCHOTT AMIRAN® Heritage Protect.



iron fixings bonded into boreholes in the natural stone. Stainless steel brackets are bolted to the iron fixings. Glazing tape, shims, glass retaining strips and sealing are used to secure the glass.

Processing glass into modern standard construction products is important to SCHOTT to meet the needs of historical monument preservation as well as structural physics and safety. AMIRAN® Heritage Protect is of interest to

architects and planners due to its suitability for processing and designation as toughened safety glass, laminated safety glass, laminated glass and multi-pane insulating glass, meeting all the relevant requirements.



SCHOTT AMIRAN® Heritage Protect in front of lead glazing



Reflections on conventional glass (no lead glazing behind the glass)

#### THE MATERIAL

- AMIRAN® Heritage Protect as laminated safety glass, 10.76 mm thick
- Extremely high transmission – minimum visible reflection (1% compared to 8% for float glass)
- Reduced reflections when viewing from unfavorable angles
- Laminated glass with protection against weathering, UV radiation and physical impact.

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