

**SCHOTT**  
glass made of ideas

**Städel Museum,  
Frankfurt**

Project report



## Invisible protection for the Triumphal Arch of Emperor Maximilian I

The non-reflecting, nearly invisible special glass SCHOTT AMIRAN® provides an undisturbed view of Albrecht Dürer's wood prints, even with extreme differences in brightness

### The background

It is uncontested. With the Triumphal Arch of Holy Roman Emperor Maximilian I, painter and graphic artist Albrecht Dürer created the largest wood print of his time; and one could say this is true in two ways. First, the work measures an impressive 3.5 meters. Secondly, Dürer's rendering of the Triumphal Arch serves as a monument to the Emperor as a glorious commander. It is an exaggerated representation of the House of Habsburg, which is expressed, among other things, in the ancient triumphal arches and external towers.

For Emperor Maximilian I, the Triumphal Arch was the most important commission he ever awarded. The masterpiece (completed in 1518) consists of 195 wood blocks. They were printed on 36 major folio sheets. For a Dürer exhibition at the Städel Museum in Frankfurt/Main, the wood print, on loan from the Herzog Anton Ulrich-Museum in Braunschweig, was presented behind dual-sided non-reflecting glass.

### The challenge

The Städel Museum had to fulfill two requirements when exhibiting the masterpiece. First, it needed to ensure that the wood print was protected against vandalism. For that reason, the protective glass covering had to be extremely stable and scratch-proof. Secondly, the glass had to provide the art enthusiast an unimpeded view of the work. To ensure this, a color-neutral safety glass was sought that can be used in all lighting conditions and produces little reflection. It also had to be available in various sizes and shapes from a work perspective, in order to allow flexible processing.





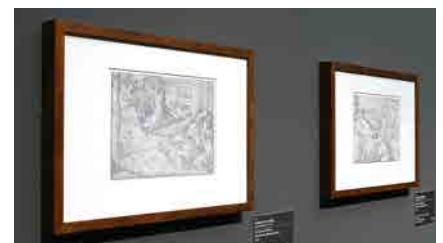
### The solution

When glazing the Triumphal Arch of Emperor Maximilian I, the glass case builders at the Städel opted for SCHOTT AMIRAN®. This special glass is absolutely robust and scratch-proof thanks to its high-tech coating. It consists of several metal oxide layers, which are applied by a sol gel dip coating process developed by SCHOTT. The high-tech coating is chemically and mechanically more stable than vapor deposited layers, for instance. Another benefit of this unusual interference coating is that it reduces disturbing reflections to one per cent and allows 98 per cent of light to pass through it. The glass is therefore nearly invisible, color-neutral and perfectly suited to extreme differences in brightness. This is a very important criterion for glass cabinets because there are major light differences in front of and behind the glass. In order to fulfil the security aspect, the glass cabinet builders used SCHOTT AMIRAN® as high penetration-

resistant laminated glass with a total thickness of approx. 17.5 mm, consisting of two panes of single-side non-reflecting AMIRAN® with PVB film sandwiched between them. The impressive total surface of about 11.5 sqm consists of three sections, which are each 3.75 meters in height. Smaller works in the Dürer exhibition were also placed behind glass made by SCHOTT. The MIROGARD® protect used is a non-reflecting, fully transparent glass, which is ideally suited for paintings. MIROGARD® protect reduces reflections in the visible range to less than one per cent and is color-neutral. Like SCHOTT AMIRAN®, it is dip coated in a sol gel process. Several titanium dioxide and silicon dioxide layers are applied one by one in nanometer precision and then burnt in. The result: a non-reflecting high-tech picture framing glass with an extremely stable surface and top UV protection. Overall, 16 panes were used.

### THE MATERIALS

- AMIRAN®  
Dimensions 3.1 x 3.75 m
- MIROGARD® protect



Advanced Optics

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