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Magazin für innovative und wirtschaftliche Lösungen
in Museen, Bibliotheken und Archiven



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Thinner, lighter and more robust: Solidification of glass

New options for the use of glass in museums and exhibitions

New demands regarding safety, sustainability, and cost-effectiveness are increasingly presenting museums, archives, and libraries with technical challenges. In particular, glazing for display cases, picture frames, and protective covers must now offer high stability, low weight, and optimal performance.

optical properties are combined. The rapid chemical solidification of glass opens up new perspectives here.



Freiberg / Saxony: CEO Michael Heidan in front of the world's second plant for rapid chemical solidification, which also solidifies flat glass sheets. © ReViSalt GmbH

Historical background and technological development

Chemicals were already being used in East Germany in the 1980s.

Reinforced glass is used industrially. These so-called super-strength glasses are characterized by high break resistance.

and longevity. However, after reunification, this technology largely disappeared from the market.

Chemical bonding is primarily used today in displays and yacht glazing. The high

End product prices justify the use of this technology.

In recent years, chemical glass strengthening has experienced a resurgence.

Technological comeback. Modern processes make it possible. significantly shorter processing times and a more economical

Application. In particular through research at the TU.

Freiberg Mining Academy and its industrial implementation

The process was further developed by ReViSalt GmbH and

opened up new fields of application.

Operating principle of chemical solidification

Chemical solidification is based on ion exchange.

on the glass surface. Smaller sodium ions are released in the process.

replaced by larger potassium ions. This exchange creates

Compressive stresses in the glass surface close microcracks and significantly increase mechanical strength. The process takes place in a heated potassium salt bath at temperature-

Temperatures around 400°C to 450°C Celsius. Despite the chemical properties

The process does not render the glass non-toxic or fully usable. In addition to increased break resistance, it also improves

the scratch and abrasion resistance of the surface.

Requirements in the museum and archive sector

Museums and archives have special requirements for glazing. Besides the security of valuable exhibits, other factors play a crucial role.

Weight, transparency, and cost-effectiveness play a central role.

Typical areas of application include:

- Protective glazing for paintings, photographs and prints
- Display cases for objects
- Safety glazing for loaned items
- Protection against vandalism and damage

High-quality specialty glass such as bulletproof glass or museum glass

While efficient, they are expensive and have limited applicability for many facilities. Chemically strengthened glass

This offers the possibility to use thinner discs with comparable

or to use higher strength.

Technological status and perspectives

Currently, glass forging can be done with the existing plant technology.

The material can be processed up to approximately 1100 x 400 millimeters.

They are suitable for experimental applications, smaller display cases, and pilot projects. The current focus is on the development of continuous production lines that enable series production.

should enable this.

Compared to traditional batch processes, which can take several hours to a day, modern processes take only minutes. This significantly reduces energy consumption and costs. Large-format industrial

Series production capability will be achieved within the next two to three years. expected.

Suitable types of glass

Basically, different types of glass can be chemically treated.

solidify. Aluminum silicate glass is particularly well suited for this.

Very high strengths achieved with short processing times.

However, due to the high material costs, it will primarily be used in

Premium applications used.

Soda-lime glass, frequently used in museums, can also be solidified and requires similarly short treatment times. The new technology of rapid chemical...

Solidification makes it possible.

Influence of the glass state

The initial state of the glass influences the result of the Strengthening is crucial. New glass has a higher initial strength and therefore achieves correspondingly better final values. Used glass can also be improved, but existing deep damage limits the effect.

A complete restoration to the original condition is not possible in the



ICP analyzer, used for analyses of, among other things, glass and molten salts be carried out. © ReViSalt GmbH

Rule not possible. For high-quality applications, we recommend... Therefore, the use of new lenses is necessary.

Advantages for cultural institutions

The use of chemically strengthened glass offers museums numerous advantages:

- Reduction of glass thickness
- Significant weight savings
- Increased fracture and impact resistance
- Improved protection against vandalism
- Reduced risk of injury in case of fracture

For every millimeter of glass thickness reduced, approximately 2.5 kilograms of weight per square meter can be saved. The typical increase in strength is a factor of four to five, depending on the specific glass thickness. of glass quality and geometry.

Certification and Standardization

ReViSalt acts as a technology provider and licensor.

Product certification is carried out by the respective glass manufacturers.

In parallel, standardization projects are being advanced in cooperation with scientific institutions. The aim is to integrate the technology into existing building regulations and

Safety-relevant standards. Certified end products are **essential** for insurance companies and rental businesses.

Advertisement



Tempered glass (left); a polariscope can be used to visualize stresses in the glass. © ReViSalt GmbH

Practical applications and references

Besides applications in the areas of tableware and safety glazing, there are already concrete references in the art world.

and cultural sector. Several theatres in Germany and

Several other European countries now use chemically strengthened glass that has been refined by ReViSalt. Background

The reduction of the risk of injury is particularly important for

Artists and stagehands. At the same time, there is a desire to avoid plastic tableware and plastic glasses.

and bottles to forgo and continue to focus on the aesthetic

and to highlight the functional advantages of glass. In this sensi-

ReViSalt was able to achieve a similar result with chemically strengthened glass in a blen environment.

To provide a safe and sustainable solution. The focus is on reducing the risk of injury and replacing plastic with glass. Transferability to

Display cases, picture frames and protective glazing are technically

It has been given and is currently being tested in pilot projects.

outlook

The rapid chemical strengthening of glass has the potential to fundamentally change protective glazing in museums and cultural institutions. Thinner, lighter, and at the same time more robust glass enables new design freedoms.

and more economical solutions. With the further development of the Plant engineering and increasing standardization will the procedure will see wider application in the coming years find. This opens up the opportunity for museums to improve security, Sustainability and economic viability must be combined in the long term. connect.

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You never notice what has been done;
One can only see what still needs to be done.