



Dante school, Bolzano (Italy)

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Retrofit of a coupled window by inserting a sealant and applying a safety film



Windows

What is the solution?

Main aim of the window retrofit in this example was the renovation of the existing coupled windows from around 1910, the improvement of airtightness, replacement of damaged panes and the conversion of glazing to safety glass. Requirement of the heritage authority was the preservation of the entire historic window construction; replacement of damaged panes was possible. The retrofit solution foresees a low impact solution, inserting a seal into a groove all around the existing window frame. Furthermore, damaged panes were substituted, and a foil applied to the existing inner and outer glazing in order to obtain a safety glazing (regulation in public buildings).

Why does the solution work?

This retrofit solution foresees a low impact solution, inserting a seal into a groove all around the existing window frame. Main aim of this solution is the improvement of airtightness, it has no impact on its U-value.

Description of the context:

Dante Alighieri School is considered as one of the most important school building in Bolzano. The architect Gustav Nolte gave the building great importance due to its comprehensive design elements in the Munich Art Nouveau style.

Pros and cons of the solution:

The pros of the solution are the preservation of the entire window construction including historic glazing and the low impact window construction (not “visible” when the window is closed). Another advantage is the improvement of airtightness and thus reduce of uncontrolled ventilation heat losses and improved comfort through less draught. The cons of the solution are a very low effect on energy efficiency and the solution does not improve the thermal transmittance of the window. Furthermore the windows remain the coldest part of the façade and condensation could occur on the glass. Another disadvantage is the impact on the historic window construction, especially when the sealant is inserted into a milling all around the existing window frame (not reversible) .

Type of data available:

Information available: Photos, digital drawings after measurement (views from inside and outside, horizontal section), description, heritage value assessment (before retrofit), thermal simulation in Framesimulator, U_w -value calculation, evaluation of conservator afterwards (Factsheet project PlanFenster)

Additional information about the solution:

The window solution was documented in the FESR project PlanFenster, including detail drawings and U-value calculation. Innovation: Application of a safety film on both window levels class 1B1 and 2B2 as it is mandatory for public buildings in Italy. the foil works simultaneously as thermal protection film.

Available pictures or publications of the solution:



Exterior view, © Dagmar Exner



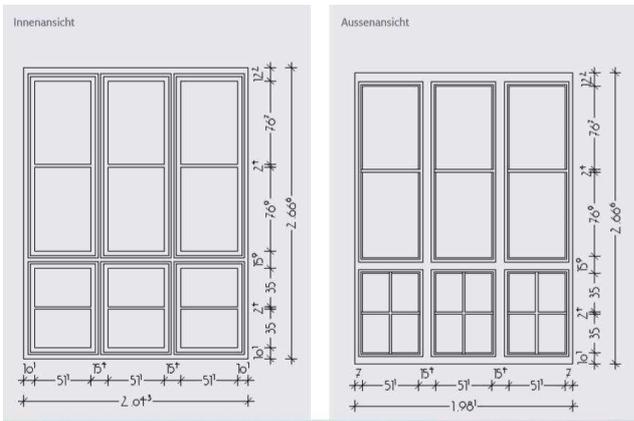
Interior view, © Dagmar Exner



Dante school building from street side, ©
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Dante school building from Courtyard, ©
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View from inside (left) and outside (right)

Thermal properties	Existing window	Refurbished window
Window type	Coupled window	Coupled window
Glazing	Inner window: 3 mm single Outer window: 2 mm single	Inner window: 3 mm single Outer window: 2 mm single
Shading	Roller shutter	Roller shutter and sun protection film
Uw	2,55	2,55
Ug	2,79	5,0
Uf	1,90	1,90
g-value glass	-	-
Air tightness	No sealing	Hose sealing
Approximate installation year	1909-1911	2009

https://www.hiberatlas.com/smartedit/projects/90/01_RE_Planfenster_Scuola_Dante_03.pdf

Further information of the solution (German)