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Digital printing in the window sector: "The potential is massively underestimated".

What would it be like if every window had the same wood grain and color, perfectly matching the front door and floor as best as possible? Or if rustic decors with rough structures and knots in the wood are in demand, but the surface should still be homogeneous? In an interview with Daniel Mund, Editor-in-Chief of Glaswelt magazine, Dr. Simon Leimgruber, Research and Development at ADLER Lacke in Tyrol, says that digital printing offers new solutions here.

Glaswelt: Wood is painted, PVC is foiled or designed with acrylic color, aluminum is powder-coated - these are just some of the methods used to apply protection or decor to windows or doors. Now digital printing comes into play. Does it mix up the surface finishing?

Dr. Simon Leimgruber: I prefer to talk about printing technology in general, because in addition to digital printing, we also deal with various other printing technologies that pose similar challenges in terms of the coating structure with primer and top coat. In many areas, such as furniture construction or flooring, printing technology is already established. For example, decors for furniture, laminate flooring, kitchen backsplashes or bathroom partitions have been printed for a long time. We are also seeing a very dynamic development among facade manufacturers, where a wide variety of materials - plastic, aluminum dibond or even wood - are being designed using the printing process. Printed elements are also being used more and more frequently for front doors. In the medium term, therefore, it can be assumed that printing technologies will become a permanent fixture in the world of surface finishing.

What is possible with digital printing in window sector?

In the window sector, we are still in the early days of printing technologies. This has mainly to do with the complex geometry of windows: The geometry of window scantlings is a real challenge, although equipment manufacturers are already

working on developing solutions for this. Once this issue has been resolved, it can be assumed that printing technologies will also become a relevant factor for surface finishing in window construction. After all, the possibilities that arise from this are manifold. Unlike wooden windows, which already have a special and individual character due to the material, with plastic the window manufacturer has a simple white surface that needs to be designed: the windows can be printed in a wood look or in a design that perfectly matches the facade design. The same applies, of course, to aluminum windows, which can also be printed. But there are also exciting prospects for wooden windows. Instead of using exotic woods, domestic wood can be printed in the look of exotic woods in the interests of sustainability. The same applies to reclaimed wood, which is in great demand, especially for front doors, but is expensive due to low availability. For other types of wood, too, the window manufacturer becomes independent of availability and price fluctuations if he simply prints the corresponding wood look. In addition, there are further advantages: The customer can determine the appearance down to the last detail and receives exactly the surface that was sampled in advance. And the window manufacturer can buy the wood in large quantities and keep a "standard window" in stock, which is then printed according to the customer's wishes.

When does digital printing make sense for window fabricators?

In the case of wood windows, in the medium term printing technology is primarily an issue for the creative and pioneering, for manufacturers in the upper quality segment who want to offer their customers individual, high-quality design and unusual looks. I see much more potential for vinyl windows. The inherent white color virtually demands a design, and printing will establish itself here alongside monochrome painted windows

ADLER has made a name for itself primarily as a surface supplier for wood-processing companies - with the digital printing initiative, do you now also see a potential market in the PVC window segment?

ADLER is closely linked to wood as a material from its history, but first and foremost we simply see ourselves as a supplier of high-quality surface finishing, regardless of the substrate. In addition to our coating systems for wood and wood-aluminum windows, we are currently also very successful with the Polycolor 2K SQ window

coating system, which was developed specifically for coating vinyl and aluminum windows. The same applies to our Print Protect coating structure for printed surfaces, which is suitable for all relevant substrates: wood, various plastics, metal, glass, foils, etc. - and I am convinced that this currently gives us the best print offering on the market, especially when it comes to exterior applications.

Is it a matter of designing a synthetic material like PVC in such a way that it comes even closer to the natural material wood in terms of its look and feel?

That is one possibility. We are already working on what is known as 2.5-D printing. Here, in addition to the colored print, a clearly perceptible structure is applied to the surface. In this way, the surface structure of wood can be simulated very faithfully. With a high-quality top coat, a vinyl window can thus come very close to a wooden window in terms of look and feel.

The technology allows many window decors to be printed economically in quick succession. So the printing is then done by the window manufacturer himself?

There are various possibilities, which we are already observing in the furniture and facade sectors: For large manufacturers who rely heavily on printed surfaces, it is worthwhile to purchase their own system. But there is also the option of outsourcing printing to specialized providers or buying the printed materials.

Could spruce and pine scantlings also be given the Meranti look?

Yes, this is easily possible in the printing process. I would go even further: The window manufacturer can offer his customer different meranti looks, with coarse or fine grain and in different color shades - and the customer will get exactly the surface as on the sample.

How durable is the printing on the surfaces?

Basically, it has to be said that printed surfaces always require a high-quality coating structure with primer and, above all, top coat to ensure lasting adhesion to the substrate and solid surface protection. The demands are very high in outdoor applications: weathering requires a coating structure with excellent adhesion, permanent elasticity and hardness, plus long-lasting UV protection, because printing

Inks have a strong tendency to fade and discolor. Without a suitable top coat, the service life of outdoor surfaces is limited to a few years - far too few, of course, for structural elements such as facades or windows. At ADLER, we have therefore sought and found a solution for printed surfaces in outdoor areas. Our new Print-Protect UV+ 2K SQ covers all the challenges mentioned above and offers high-quality UV protection that preserves the appearance of the printed surface over the long term. We tested the coating in weather conditions like those found in Arizona, and the results exceeded even our own expectations: While there was not much left of uncoated comparison surfaces, Print-Protect UV+ 2K SQ protected the substrate perfectly.

How big do you think the market for windows will be in the future?

As I answered earlier, I expect noticeable growth in the PVC sector in particular, while it is still difficult to assess developments in the wooden window sector - I assume that printing will only be used in isolated cases for the time being. Digital printing is still in the development phase.

What hurdles have to be overcome?

There are currently two hurdles: Firstly, the system technology, which is already widely available for flat surfaces, but not yet for complex geometries - but it can be assumed that a great deal will happen here in the next few years and that the increasing demand for printed surfaces will also boost the development of the corresponding technologies. There are also exciting developments in the field of base and top coatings. We are confident that we will soon be able to offer our Print Protect coating in a full UV version. The application of excimer technology, currently used by furniture manufacturers, is also an exciting prospect. The second and perhaps even greater hurdle is in the minds of the manufacturers. The enormous potential of printing for surface design is still massively underestimated at the moment, and the necessary knowledge is also often lacking. Anyone who wants to offer printed facades, front doors or windows does not have to be a print expert themselves, but of course they need a basic knowledge of the possibilities and limitations of the technology, as well as the relevant contacts. That's why ADLER co-founded the digital printing association DIPA a few years ago, which aims to close precisely this gap: impart knowledge, create opportunities, show best practice

examples, and bring interested parties into contact with each other. In addition, the DIPA Academy will be launched in the fall of 2023, offering in-depth training for printing technologies.

Thank you very much for the interesting insights! I am curious to see which designs will be used to print windows in the future.

ADLER – paint runs through our veins

With around 720 employees, ADLER is Austria's leading manufacturer of paints, varnishes and wood preservatives. Founded in 1934 by Johann Berghofer, this family business is now managed by a member of the third generation, Andrea Berghofer. Every year, 21,000 tonnes of paint leave the Schwaz plant and are delivered to customers in more than 30 countries worldwide. ADLER has sales subsidiaries in Germany, Italy, Poland, the Netherlands, Switzerland, the Czech Republic and Slovakia; their sole production site is the ADLER-Werk Lackfabrik in Schwaz, Tyrol (Austria). ADLER was one of the first companies in its sector to be 100% climate-neutral, achieving this milestone in 2018. The company has been able to reduce its carbon footprint to a minimum through a wide range of measures. ADLER offsets any unavoidable residual emissions through the purchase of recognised climate protection certificates, thereby helping to finance new climate protection projects.

www.adler-lacke.com

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ADLER_Fenster Digitaldruck 2.jpg: Alpine panorama on the frame - why not?

Windows can be individually designed and refined using printing technology.

ADLER_Simon Leimgruber.jpg: In an interview with Glaswelt magazine, Dr. Simon Leimgruber, Head Development Team Window and Construction Coatings / Industry at ADLER, explains the enormous potential of the technology.

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