

Problem: Veneer Moisture

Production advice for softforming conglutination and profile wrapping conglutination

Already more than 150 years ago, Michael Thonet found out that the flexibility of wood increases if the moisture content increases as well, thus the chair no. 14 was established - the epitome of the wood bending technique.

Even the flexibility of veneers depends on the wood moisture and therefore a high moisture is desired by softforming and by wrapping. However, too much moisture leads to problems in the gluing process and in further production processes.

Nowadays, it is assumed that the ideal wood moisture is between 9 to 11% for standardised wrappings and for softforming processes. In this case gluing by means of hot melt adhesives results in the best possible adhesion and final adhesive strength, the further processing, such as sanding or lacquering, turns out to be trouble-free as well. Especially when lacquering a veneer surface which is too humid risks might occur, if the wood moisture drops by more than 5% afterwards.

However, if the veneer is too dry when processing, cracks will occur during wrapping which in almost any case will run across the entire material thickness and can hardly be repaired. The problem gets worse as the material gets thicker, i.e., the thicker the veneer or the wood, the higher the tension. Depending on the particular wood species and the specific transverse tensile strength of each wood, divers wood species or veneers can absorb a different amount of stress before they break or tear. This tearing is compensated or improved by applying different fleeces on the back of the veneer and by sanding the veneer down to a thickness of a few 1/10 mm. Nevertheless, a precisely-adjusted wood moisture is indispensable in the gluing and shaping process. Controlling and adjusting the wood moisture is safest done by means of the theoretical moisture content equilibrium. Any veneer or any wood adjusts its own moisture to the environmental climate. This might take some time, whereas an adjustment to the room climate only happens if the room is closed, and if the mass ratios are relatively equal. This is taken advantage of in drying chambers, for example, and tables of moisture content equilibrium were developed which can even be used inversely.

A room having the right temperature (10 to 30°C) is necessary, which can be supplied with the necessary moisture, in the simplest case by means of a large water surface. Now, only the relative air humidity needs to be controlled, which can be changed or maintained constant by heating, moistening or spraying.

If the room climate is approximately 15°C and the air humidity 55%, veneer or wood automatically adjusts its moisture to approximately 10% Ugl after a certain time. This moisture is called the moisture content equilibrium of the wood. After extensive tests were made, it is assumed that veneer rolls, for example, have already reached the determined moisture content equilibrium within 3 days. In order to exclude problems when spraying hot melt onto the veneer or onto the backings, you should always blow off the substrate by means of hot air shortly in front of the hot melt applicator roll. This procedure leads to a heated and dried surface, i.e., perfect conditions for the adhesion of hot melts are created. Problems mainly occurred, if the hot melt application from the applicator roll to the substrate (veneer, fleece, etc.) was not made with constraining pressure but by residual stress,

deflection or longitudinal tension. In this case, it was (without any scientific proof) spoken about a moisture cushion in the angle gap between substrate and applicator roll, which prevents the substrate from being properly sprayed with hot melt. Thus the adhesion is diminished, especially at the beginning of the applied veneer edge.

Production advice for veneer edges and profile wrapping veneers

In order to generally compare the different versions of equipment of profile wrapping veneers or softforming veneers, the veneers should at first be adjusted to a moisture content of approximately 10% Ugl by means of a corresponding storage. The veneer edge supplier influences the veneer by two general actions:

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By different backings, i.e., by different fleeces with 20g, 30g or 50g on the basis of paper or melamine resin. Even double fleece is offered.

Generally said, the thicker the fleece, the higher the transverse tensile strength of the veneer, whereas, however, the cleaving resistance gets correspondingly worse. This is why double fleece is chosen for extreme requirements. A good transverse tensile strength in combination with a very good cleaving resistance especially creates good results when shaping inner radii.

For outer radii a different way is to be chosen:

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The flexibility of a veneer is changed or improved by reducing its thickness by sanding; i.e., the thinner the veneer, the more flexible it becomes.

Technically said, only by having the corresponding backing (fleece), can the veneer be sanded correspondingly thin. Nowadays, the limit is approximately 0.30mm, whereas the entire thickness (veneer plus fleece) is always measured. After sanding, the remaining wood thickness and thus the flexibility are caused depending on the thickness of the laminated fleece.

From a technical point of view, the remaining wood thickness now determines the surface tension when shaping the profile wrapping veneer and consequently determines, if it breaks or tears. Now the wheel comes full circle, because the residual flexibility strongly depends upon the wood moisture.

The supplier can only set the material thickness and by that create the static prerequisites which are above all decisive for the outer radii. Both methods mentioned above offer a variety of possibilities which should be chosen depending on the profile in the first place, and secondly depending on the wood species. It goes without saying that the veneer quality is a decisive factor as well.

Yet, we must mention that the surface quality becomes worse by a decreasing overall thickness, because imbalances in the substrate, in the hot melt adhesive or even in the process itself will have a stronger impact on the surface. Therefore, there are no longer only pressure rolls, but also pressure pad systems, which should cause more „steadiness“ in thin substrates when shaping.

Thus you should always take into consideration the process and the substrate according to the requirements.

However, all those details which are already important for raw profile wrapping veneers must be taken into account even more accurately for flexible lacquered profile wrapping veneers. In the first place, the moisture equilibrium must be balanced. Despite the lacquering, the veneer rolls absorb or release moisture; even if this happens slower. Raw veneers are always further processed, i.e., sanding reduces cracks and brings „steadiness“ into the surface.

Prefinished lacquered veneer edges or profile wrapping veneers can only be further processed by complex features; nevertheless, we will describe two of them:

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In the field of profile wrapping, cracks are immediately remedied by means of cloth friction disks. According to the quality requirement, you may advance the spot-grinding of the existing crack by adding paraffines or polishing agents, so that it cannot be perceived in a visual as well as in a tactile way. In fact the crack remains, however, it just cannot be discovered.

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At the crucial spots you may re-sand with Scotch Britt or with abrasive paper. However, the veneer edge has to be either re-lacquered completely or only at this spot.

A neat processing of a softforming edge or a profile wrapping by means of the conventional production method, such as „raw“ wrapping, surface sanding and subsequent lacquering, is superior in quality compared to the prefinished lacquered version. However, it is also the more expensive version. Due to this fact and owing to the increasing environmental awareness, there is a trend towards using prefinished lacquered veneer edges and profile wrapping veneers.

So far, the problem has mainly been viewed from the part of the veneers without taking into consideration the advantages and disadvantages of the different carrier systems or adhesives. Just think of the difference between MDF fibre board and particle board or the necessary adhesives.

For the best result (whereas each detail is important) you must pay attention to all factors, and hence a close cooperation between supplier and processing industry is indispensable.

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