Why bumble bees fly and vacuum presses have become standard.

Author Stefan Katzer (Expert)

According to the laws of physics, bumble bees can't fly. But since bumble bees don't know that, they fly anyway. It's similar with a gluing technology that still makes some wood processers uneasy but has long been used profitably by many others. Vacuum gluing. Originally developed for mold gluing without a counter-template, vacuum presses are now used more and more for veneering and covering with HPL and other laminates. But how does it all work? How can a thin membrane of natural rubber exert enough force to ensure optimal gluing results?

This is exactly the point where physics comes into play. It's not actually the membrane that exerts the force — the pressure comes solely from the atmosphere. And the more air is removed from the closed space below the membrane, and the greater the difference between the ambient pressure and the pressure below the membrane, the harder the atmosphere presses on the workpiece. It's similar to diving, where the pressure increases the deeper one gets below the surface of the water. We are at the bottom of an enormous ocean of air, and with vacuum technology we use the air column that exerts 10 tons of pressure per m^2 on the workpiece at a vacuum of 98% (achieved by using an oil-lubricated vacuum pump). This immense pressure is exactly the same on every square centimeter, and the differences between plate material, veneer, laminate or glue application play no role at all anymore.

In addition to uniform pressure, the strong vacuum offers another advantage that makes the technology economically interesting: The vacuum lowers the boiling point of water, which greatly reduces gluing times when white glue is used. This makes the same gluing times possible for a vacuum press with an oil-lubricated vacuum pump as for a heated laminating press. However, the big difference is that there is no more need for heating plates that consume 15 kW or more, but just 120 to 150 watts. Because the vacuum press with the membrane exerts no mechanical pressure on the workpiece, even with sensitive surfaces (such as high-gloss HPL), it doesn't matter whether there is a speck of dust, a wood chip, adhesive tape for fastening or glue residue on the membrane. Thanks to the physical properties of the identical pressure at each location, there are absolutely no impressions here. However, this applies only to the top of the workpiece. On the bottom, work must be done with the same care as with an ordinary veneering press.

Versatility is probably the feature that users most value in their vacuum presses. In addition to the aforementioned shape and surface gluing, the vacuum technology also does very well with sheathing, edge gluing and things like paneling with old or split wood. The only limits are set by the user's creativity, and sometimes by physics (think about the bumble bee!).

Another application is shaping mineral materials, such as Corian, HI-MACS and Rauvisio, along with thermoplastic materials like acrylic glass (PMMA) and ABS. For this, the thermoplastic is brought to the optimal temperature in a preheating station, and then shaped in the vacuum press through perfect pressure distribution. To endure the high temperatures, a silicone membrane is used for these applications.
The advantages are there to see. More and more users employ the advantages of a machine that has quickly become indispensable to the plant. Because in wood processing operations, creativity is standard.

BARTH GmbH, Edelham 73, D 84550 Feichten, GERMANY
Tel. +49 8634 9827 0, Fax +49 8634 9827 27
info@barth-maschinenbau.de, www.barth-maschinenbau.de

+49 8634 9827 0
info@barth-maschinenbau.de