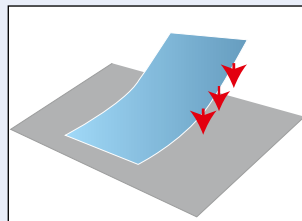
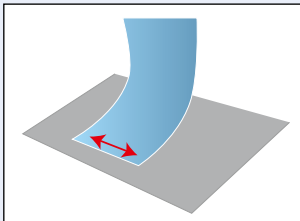


Bubble-free application of self-adhesive products

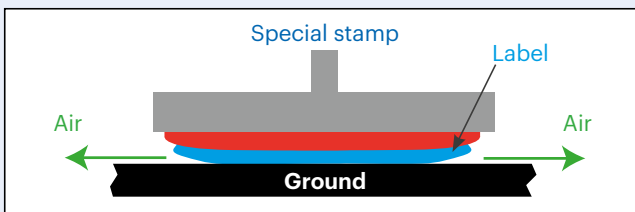
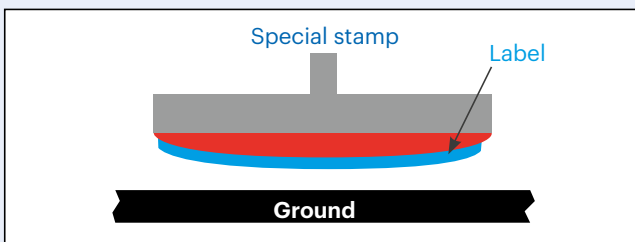
An undesired bubble formation during the application of self-adhesive labels is not only a visual nuisance, but also costs time and money due to the disrupted application process. In general, malfunctions during the label application can be differentiated into error categories. First, there is a physical cause, which means bubbles and air pockets form immediately during the application of labels, mostly involving larger formats. The second cause on the other hand involves the formation of air bubbles over time. The cause is the application surface, which most of the time is plastic that emits gas over time and therefore forms air pockets under the label. The objective is now to further investigate the formation of bubbles and to devise practical solutions.

Physical air inclusions

What works with smaller labels without any issues, causes problems with the application of large-format labels. If you don't pay attention, an air bubble can form very quickly, and is then difficult to remove. The most important principle during manual application: Do not fully remove the self-adhesive label from the carrier material. First, only peel off a small piece along the short side of the carrier material. This way, you can position the label exactly where it needs to stick later. Then, use a hand or a small squeegee to slowly press the label on the surface in a sweeping motion in one direction while simultaneously and slowly pulling back the carrier material.



The automatic application works similarly. The secret is to not just slap the label on, but to apply it in a precise manner. The application stamp of the system should be adjusted to fit the conditions of the application surface and the label form.



Bubble formation during the application

Especially over-sized formats bear the risks of forming folds and air conclusions because in spite of careful work it is almost impossible to apply the glue evenly on the surface.

Air bubble formation during chemical reaction due to outgassing

Outgassing surfaces - this spells unpleasant conditions for the label-processing industry. What exactly does "outgassing" mean? When studying the issue of undesired bubble formation, "outgassing" is related to the composition of the surface materials. Thermoplastic sometimes release gases during their product lifetime. In case polycarbonate, this would be carbon dioxide and water vapor; in case of acrylic glass, it is residual monomers. This process can also be accelerated through the impact of temperatures above 50°C. Polycarbonate is a solid, very hard plastic which is often used for construction parts in the automotive and electronics industry due to its high resistance and low weight. Acrylic glass on the other hand offers a variety of applications for architectural use such as light strips, terrace roofs or exhibition booth construction. The issue: With these materials, the problem of "outgassing" may first occur many years after the construction. In comparison, materials such as metal and glass do not exhibit any outgassing effects. Other plastics usually only release gas immediately after the manufacturing process. Among other materials, this also includes mold injections made of polypropylene or polyurethane.

Why do materials release gases?

The cause for this phenomenon may be a rising gas pressure. Under the influence of rising temperatures, the pressure in the plastic rises so that - as in the case of polycarbonate - carbon dioxide and water vapor escape. Everything initially looks like clean work after the application of the foils. However, weeks and sometimes even months later clearly visible bubbles form on the surface.

Visual defects lead to doubt in the product quality.

Because foils and adhesives are almost gas impermeable, air inclusions cannot escape fast enough. Especially in connection with heat, this leads to punctual debonding effects between adhesive and surface. The consequences of a visual impairment of the appearance of products are often underestimated. Users that are looking at a defective label often also draw conclusions with respect to the quality of the product. When faced with defective labeling, the buyer or user potentially also has doubts about the functionality of the product itself.

Smart solutions

The answer to air inclusions that occurred during the application can be micro-structured adhesives with air channels. Immediately after the adhesion, the air can escape via the channels or can be smoothed out with the help of the squeegee. Solutions for outgassing services may also be a gas-permeable combination of foil and adhesive. Semi-permeable materials allow a fast escaping of the air inclusions. The suitability of the material must be checked individually for each application because the functionality depends greatly on the extent and duration of the outgassing. In case of outgassing surfaces, together with the client we will take a close look at the surfaces onto which the labels are to be applied. Depending on the results, a rapid outgassing test may be necessary. Following a conclusive assessment, various designs will be tested to ensure optimal suitability to prevent bubble formation. Ultimately, only tests and competent consulting services can prevent time-consuming and thus expensive follow-up work.