The “Swiss army knife” of adhesive technology? Adhesive tapes: often underestimated, yet they provide many answers to current challenges

When you look at the range of applications, functional scope, and development potential, it’s always surprising why this joining technology is still underestimated. On the other hand, users may find their choice of technology validated by the following statement. For everyone else, this might offer some inspiration to consider the diverse potential of tapes in future bonding projects – particularly regarding multifunctionality and sustainability. After all, Swiss army knives are used by a great many people – and for good reason, aren’t they?

Interviewed by *DICHT! Magazine*, Afera President Evert Smit discusses how adhesive tapes are evolving into multifunctional, future-proof solutions that not only meet rising regulatory demands but also offer untapped potential across industries—from sustainable bonding to smart, robotic applications.

“With tapes too, the focus on planned regulations is becoming increasingly important in order to make adhesive system decisions that are future-proof.” – Dr. Evert Smit, President of Afera, The European Adhesive Tape Association

Ongoing developments are being driven by current trends. “Debonding on demand” is the answer to repair and recycling. These new functions are opening up ever more areas of application, and sustainable raw materials are making the technology increasingly eco-friendly. In addition, new or long-established processing methods are creating new potential. One example is flexographic printing, which is certainly not widely known, yet relies on adhesive layers – usually adhesive tapes – to function.

The possibilities are vast. But where there is light, there is also shadow. Increasing regulatory requirements will need to be addressed in the future – and rightly so! This presupposes, for example, dealing with possible regulations under REACH. Furthermore, more and more raw materials will become difficult to source in the future. The reasons are many. One example is bio-based materials: The adhesive tape industry should engage more intensively with these, so it can become a major player in the future management of limited resources. After all, adhesive tapes will be urgently needed for an increasing number of applications.

The use of adhesive tapes brings advantages in many areas of application, which often go untapped in practice because engineers “don’t have this joining technology on their radar” or lack the specialist know-how. One example is vibration and noise damping in mechanical and plant engineering. Viscoelastic damping tapes can be used specifically for passive damping – for instance in housings, control cabinets and panels. They are easy to apply – without screws, rivets or additional damping

elements. The same applies to fire protection bonding in interior fittings and vehicle construction. Compliant fastening of fire protection materials is often time-consuming and error-prone. Heat-stable, flame-retardant adhesive tapes could permanently fix these materials. Combined adhesive tape solutions could also deliver smoke-gas-tight bonds. The use of adhesive tapes is relatively straightforward, provided the respective framework conditions are observed and a wealth of practical tips followed. Tapes don't just stick – they form permanent bonds if used correctly. Those who understand surfaces, applications, environments and mechanics can turn a simple tape into a high-performance joining system.

The development of tapes is far from over. New adhesive systems are becoming more intelligent, more reactive and reversible. Examples include hybrid adhesives and dual-cure systems. The combination of pressure-sensitive adhesives (PSAs) and a chemically curing component (e.g. UV- or heat-activated resins) allows for quick assembly thanks to immediate tack, and high final strength through reaction – up to structural bonding in tape form. Function integration in both carrier and adhesive layers is also increasing. Examples include electrically conductive tapes and thermally conductive tapes for use as thermal interface materials (TIM), potentially replacing thermal pastes. The advantages here are easy assembly and reliable performance.

Progress is also being made in robotic application. Special application heads for industrial robots provide consistent quality at high volumes – even with complex geometries. At the same time, inline quality control capabilities are improving, with sensors monitoring bonding pressure and position to achieve 100% in-process quality control and minimise waste.

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