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Different plastics now bondable thanks to unique tape solution, tesa® HiP

The demand for plastics in automotive manufacturing continues to grow as it remains a durable, cheap and lightweight solution to many modern manufacturing challenges. But plastic on plastic solutions, whilst visually appealing, can be notoriously difficult to bond cleanly, quickly and securely.

Launched earlier this year, tesa® HiP (High Initial Performance) was born out of a specific automotive requirement for a customer who had historically used ultrasonic welding but encountered a confining shape issue. tesa created a flexible hybrid tape in order to fulfil this need, designing, testing and perfecting the product at the company's Application Solution Centre in Hamburg, Germany. The solution proved to be ideal for the customer, but also offered a number of additional benefits, from clean adhesive bonds and thinner material capabilities, to the elimination of heat-induced dents, visible screw connections and geometry limitations.

Available in a roll or in die-cut form, tesa® HiP is made from a single layer performance polymer foam. Capable of bonding all common plastics immediately after application with no curing time, this is the first and only tape that bonds even different plastics with different surface energy or different stiffness. It is distinctive to any other adhesive solution as no other performance tape includes the same Z-axis pull-resistance suitability, making it a comprehensive alternative to traditional joining methods. Testing has shown that resistance of up 150+N/cm is possible.

Typical application areas for tesa® HiP includes the assembly of door panels, cockpits, dashboards and instrument panels.

Design Freedom

Material restrictions have long been considered a limiting factor in any automotive product design, but thanks to the emergence of tesa® HiP, designers have more freedom than ever to use their imaginations with no restrictions. Any two plastics, whether they be desired for aesthetic or cost-saving purposes, can now be bonded together quickly and accurately, as well as adhesive joints created in all directions. No matter if bonding PP to ABS or PA to PC, this innovative solution makes even low surface energy (LSE) bonding instantly possible.

tesa HiP removes any risk of marking to the outsides of bonded surfaces meaning previous limitations on material thickness are no longer applicable. No heat or additional steps are required. Simply attach the tape to one of your (clean and dry) materials, press together, and the job is done.

The ability to join dissimilar plastics with different melting points instantaneously not only opens a world of new possibilities for designers, but also boosts overall efficiency of production. Ultrasonic welding of different plastics has long been an issue, due to differing melting points, so hotmelt, liquid glues or mechanical fixings have historically been used, but these processes are messy, time consuming and add weight. As it takes the form of a lightweight adhesive tape, tesa® HiP solves this conundrum and additionally eliminates the need for any pre-treatment. It takes just seconds for tesa® HiP to reach 80% bond strength, speeding up existing methods considerably and resulting in fast and hassle-free application. Pausing a job to wait for 'wet out' to take place is now a thing of the past.

Futureproofing

The ongoing electrification of the automotive industry is well documented, with some MPs even calling for the planned 2040 ban on new petrol and diesel cars to be moved forward to 2030. But with battery packs weighing more than a standard car engine, other areas of weight-saving across vehicles will need to be identified in order to compensate.

The addition of small metal rickets may not appear to make significant difference to overall weight, but once a complete vehicle is finished, every saved gram matters. For today's petrol or diesel customer, fuel efficiency is an obvious benefit of owning a light-weighted vehicle, with every 10% in weight saved calculated to save 5-7% in fuel costs.

As well as the increase of electric vehicles, general autonomy in the manufacturing environment is another area that shows no sign of slowing down. Factories with automated joining processes will benefit from tesa® HiP as the product lends itself to machine applicator heads, which can be created bespoke in order to fit any shape or size required for a robotic arm to carry out its function seamlessly.

Low-VOC

Due to its initial creation in response to an interior automotive application, tesa® HiP has been created with reducing VOCs (volatile organic compounds) in mind. Car manufacturers worldwide have implemented a number of measures in recent times to improve cabin air ventilation and the filtration of toxic chemicals. VOCs can be found in adhesives, fabrics, plastics and other materials commonly used in the construction of a vehicle. tesa® HiP has been designed to meet OEM emission limits, using Chinese GB standards as its benchmark since China is a leader in terms of low VOC standards.

Cost-implications

Investment in the right tools for the job is essential for vehicle manufacturers but can prove costly. Traditionally, plastics would be bonded by either clips, gluing or require investment in expensive ultrasonic welding equipment. Utilising tesa® HiP leads to leaner processes, improved effectiveness and profitability in automotive manufacturing. Lower scrap rates and lower storage costs are benefits users will come to expect. No additional material for pre-treatment means the adhesive rolls only require little space to be stored. Fewer process steps are necessary because the product is ready for use immediately. Due to these immediate bond properties, the tape may not be suitable for elements that need to be slid into place, but if face-to-face processes are the established requirement, this instant solution represents a significantly cost-effective alternative.

Showing a reliable bond in temperatures ranging from -30°C to 100°C, manufacturers of interior applications can be confident in the tape's temperature resistance properties. Furthermore, tesa® HiP shows outstanding performance in both dynamic shear resistance and pull resistance, which is often an essential requirement for component manufacturers. The range of tapes come in three different levels of thickness, tesa® 92105 (500µm), tesa® 92108 (800µm) and tesa® 92111 (1.1mm).

Mike Poulton, Key Account Manager from tesa UK's automotive team said, "We understand that freedom of design is an integral factor in turning automotive concepts into reality. By removing process restrictions, such as the need for ultrasonic welding equipment and associated costs, these tapes will help previously impossible ideas come to life. Process optimisation is achievable thanks to the removal of long curing times and the need for pre-treatment."