



GLOBAL APPLIANCE OEMS BENEFIT FROM IMPROVED CONSTRUCTIVE BONDING

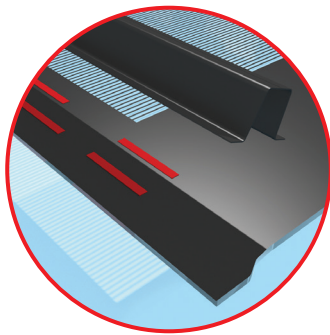
Double sided viscoelastic acrylic core tapes improve both the bottom line and the brand

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With the domestic appliance market forecast to reach global sales of USD 246.3 billion by 2022 (Source: Grand View Research), consumers have clearly put the 2008 recession behind them. With greater disposable income and strong demand for new homes and remodeled kitchens, today's appliance buyers are looking for a greater range of product innovation and performance from the world's major appliance manufacturers. At the same time, facing such strong opportunities for growth and profitability, global appliance OEMs are looking for viable ways to capitalize on these favorable market conditions.

Product innovation, led by growing consumer demand for smart appliances, will continue to provide manufacturers a meaningful way to differentiate their offering. Over time, however, the companies that can find new production and supply chain efficiencies will be in the strongest position to take advantage of the growing global appliance market. To maximize production without sacrificing product quality, every aspect of the assembly line should be evaluated and optimized. The following article explores one area of appliance construction where new technologies offer substantial benefits to both the manufacturer and the consumer.

Efficient assembly of an oven door utilizing double sided viscoelastic acrylic core tapes



The Bonding Benefits of Double Sided Viscoelastic Acrylic Core Tapes in Oven Doors

Mounting metal brackets or bonding directly to the decorated glass as part of constructing an oven door is frequently done with conventional joining methods like liquid glues. This is an inefficient technique that can be improved by using a double-sided viscoelastic acrylic core tape. Global appliance OEMs who have made the switch to constructive bonding tapes have seen significant improvements in production time as well as an increase in overall efficiency. In addition, consumers increasingly prefer a sleeker, state-of-the-art kitchen appliance design that complements the interior décor of their home. By eliminating the need for visible fastening methods, pressuresensitive adhesive tapes enable a cleaner, more seamless oven door.

1. Process Time Reduction

Unlike double-sided viscoelastic acrylic core tapes – where the adhesive forms a permanent bond in seconds – liquid glue requires a period of uninterrupted cure time to set up and achieve maximum bond strength. During a liquid glue's cure time, any movement on the assembly line will result in misaligned parts and a compromised bond. Liquid glue is also very sensitive to temperature and humidity

fluctuations. Heat accelerates the curing mechanism, while on colder days it cures more slowly, which results in greater variability in the production process. Similarly, a highly humid plant environment will speed up the cure, which challenges manufacturers to have the right process controls in place.

2. Application Efficiency

Whether it's dispensed from a drum, a pail, or a cartridge, the use of liquid glue on an assembly line is a complex, expensive application process. From the cost of the disposable mixing tips to the energy and maintenance required to operate the dispensing tools, liquid glue requires a significant ongoing investment compared to double-sided viscoelastic acrylic core tapes – which come in easy-to-use rolls and can be specifically die-cut into the shape required for various oven doors. Additionally, oven manufacturers incur process costs due to purging of the liquid glue dispensing system. During production, if the ratio of two component liquid glues becomes uncalibrated, OEMs incur time and material costs to redo the manufacturing. Also, with liquid glues, there are VOC controls in the facility, which adds an additional expense for hazardous waste disposal and personal protection equipment (PPE).

Advantages of double-sided tapes vs. liquid glue and mechanical fastening

		Double-sided tapes	Liquid glue	Mechanical fastening (e.g. rivets, screws, nails)
Design	Improved visual appearance – no damage to the material	••••	•••	•
	Invisible fastening – mounting transparent materials	••••	•••	•
Assembly	Fast application process – eliminates curing time and reduces complexity	••••	•	••
	Healthy working environment and clean production sites	••••	••	••
Quality	Compensates for irregular or uneven surfaces – gaps between bonded surfaces are eliminated	•••	••••	•
	Compensates for tension and stress dissipation – single bonding point with mechanical fasteners can lead to material breakage	••••	••	•
	Noise-damping properties – sounds caused by vibration are eliminated	••••	•••	•
	Shock absorption	••••	••	•
	Sealing function – tape seals and protects against dust and moisture	••••	••••	••
	Reduced risk of corrosion	••••	••••	•

•••• Very good ••• Good •• Medium • Low

3. Stress Dissipation and Design Flexibility

One of the challenges faced by oven manufacturers is designing oven doors with fastening methods that can absorb and compensate for the physical stress caused by the thermal elongation of dissimilar materials. The coefficient of thermal expansion, which defines the rate at which different materials expand and contract when exposed to varying temperatures, can vary greatly in these diverse substrates. Therefore, in oven

door applications utilizing components such as metal and glass, they will push and pull on each other after they have been bonded throughout the oven's life cycle. These forces will cause stress to build up, which can lead to oven door defects such as warping and de-lamination. Double-sided viscoelastic acrylic core tapes are able to provide excellent stress dissipation, enabling manufacturers to provide a higher quality oven due to the ability of the bond-line to withstand these differential movements.

4. Temperature Resistance

When it comes to oven doors, the fastening solution must be able to withstand elevated temperature environments. Because they can resist temperatures up to 220°C (approx. 430°F) directly at the bond, double-sided viscoelastic acrylic core tapes are able to provide a viable solution. In addition, these types of tapes can deliver outstanding cold shock performance down to -40°C.

5. Aesthetic Appeal

During production, double-sided tapes provide many advantages over traditional fastening methods, but one key competitive advantage happens after the appliance has left the factory. Because high-performance adhesive tapes can seamlessly bond multiple substrates together with no unsightly glue residue or read through, the resulting product offers consumers a more aesthetically pleasing option.

Conclusion

Within the appliance assembly process, adhesive tapes continue to improve the inefficient ways of the past. High-performance viscoelastic acrylic core adhesive tapes can bond multiple substrates together, improve aesthetic appearances, and allow for stress dissipation as compared with traditional fasteners. No special tools are needed to apply

these tapes, while simple dispensing solutions easily speed up production times. Training time can also be significantly reduced with adhesive tape technology, since tape doesn't require the kind of complicated tools needed for traditional fasteners. In terms of both time and money, adhesive tapes outperform other fastening methods, including liquid glues, rivets, welds and screws.

About tesa tape, inc.:

tesa is a leading manufacturer of pressure sensitive adhesives serving the appliance, automotive, building supply, electronics, industrial, paper and print, and transportation industries. With our reliable solutions and excellent service, we support industry partners in optimizing their processes and improving their products

About ACX^{plus}:

tesa[®] ACX^{plus} is a high performing acrylic core tape for permanent interior and exterior applications. It provides a fast, powerful, aesthetically pleasing bond on materials with different surface characteristics thanks to an acrylic adhesive system that enables optimal wetting and chemically adapts to the bonded surfaces. In addition, the tape thicknesses can be adjusted to compensate for rough and uneven surfaces. The result is a high strength bond that will last for decades.