Polyester (PET) Wine Bottles

1.0 Introduction

As the wine industry moves to innovative economical packaging materials, polyester (PET/plastic) bottles have become introduced as an alternative to glass. Although PET containers are not new to the overall label and packaging market, the use of specialty wine labeling adhesives and facestocks is innovative.

PET has been shown to reduce weight in a finished package which benefits the reduction of shipping costs as well supporting sustainable efforts. PET will not fully replace glass in the wine and beverage markets, but Avery Dennison is prepared to answer application questions when the need arises.

2.0 Purpose

This technical bulletin discusses the performance of Avery Dennison wine labeling stock, specific to adhesive performance. As with glass containers, the facestock will ultimately play a role in how the adhesive performs, with the adhesive having a larger impact on PET bottle.

3.0 Bottle Surfaces

Glass bottles typically have two types of coatings applied: AP-5 or oleic acid, or the newer Polyethylene (PE) surface coating. PE coating has traditionally been better for pressure-sensitive labeling, but both are acceptable and successful. Testing has shown an increase in initial tack when PE is used as a coating, ranging from 10-30% higher in pounds per inch. Ultimate adhesion between the two coatings is not as dramatic, being only 5-10% different. Although PE is the better coating for pressure-sensitive labels, it has impacted the thickness these coatings have been applied at. Since the coatings are anti-scratch or slip agents, they act as a release coating to pressure-sensitive adhesives. Additional coating thickness has traditionally meant lower adhesive initial tack and adhesion. The higher coat weights of these coatings can also impact ice bucket performance. There is no way to measure how much coating thickness has been applied to a bottle, so coatings cannot always be determined as the root cause of a failure.

PET wine bottle surfaces are different. They do not have the anti-scratch or slip coatings applied to them. This makes the surface more predictable for labeling, providing the surface is dry. The high surface energy is excellent for label adhesion. Polypropylene and polyethylene are examples of low surface energy plastics, which offer low initial adhesion levels for labels.

Condensation and cold fill temperatures pose additional challenges in the use of pressure-sensitive labels. Water on the surface typically deadens a pressure-sensitive adhesive, reducing the initial tack of these products. It is recommended an air knife system be used to reduce the amount of water on a bottle surface.

4.0 Adhesive Performance

Two primary adhesives sold into the pressure-sensitive wine labeling market by Avery Dennison are S100R and AT20 adhesives.

S100R is known to be more permanent with limited repositionability, maybe one to two minutes, before the label becomes too permanent to cleanly remove. The initial tack of S100R on PET is slightly higher than on glass, on average about 10% in pounds per inch due to the coating thickness. PET shows higher adhesion overall in ultimate adhesion but only 1-2% higher in peel adhesion.

Performance of S100R on cold or wet bottles is similar with PET, but the most dramatic difference is in ice bucket testing. S100R was designed to remove from a container once the facestock has become completely saturated and the adhesive activated. However, with PET, the S100R develops a permanent bond in wet conditions. It easily passes a standard 12-hour ice bucket test, with no label movement under pressure and is nearly impossible to remove cleanly from the surface.

AT20 adhesive has been the choice for repositionability in the wine market. Overall on PET, we see about 20% higher initial tack and 1-2% higher ultimate adhesion. This is measured in pounds per inch, which is the industry standard. AT20 had an extended time for repositionability on the PET surface. This is unusual in having higher initial tack, but a longer reposition time.

The labels will not have edge lift if properly wiped-down, but it could take more than 24 hours before becoming permanent on the container.

Cold and wet surfaces did show some change, with the initial tack and ultimate adhesion being somewhat higher than on glass. Both the S100R and AT20 adhesives easily passed the ice bucket test. The bond of the AT20 to the PET surface is high when wet so the label cannot be removed yet can be repositionable when dry. This feature makes the use of AT20 or S100R very successful for the airline industry where extended ice bucket storage is a requirement.

5.0 Conclusion

The market may or may not see a shift to PET wine bottles, but if it does, Avery Dennison can expect to see our standard products perform without many concerns. Since plastic containers do generate more static on a moving bottling line more focus may be needed when making a change to plastic. Changes to the wipe-down mechanism are not expected, but some adjustment may be required.

As with any application, it is recommended to completely test all of the materials to determine their fitness for use, both in labeling and end-use.

Visit www.label.averydennison.com for our warranty statement and terms and conditions.

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