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CONTAINER WITH LABEL ADHESIVELY ADHERED THERETO

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1 Claim. (Cl. 215—1)

This invention relates to a hydrophilic coating composition for application to hydrophobic materials.

In the application of labels to hydrophobic surfaces such as polystyrene, it has been found difficult to obtain proper adhesion utilizing water-soluble adhesives such as gum arabic, gum tragacanth, or water-activatable dextrine type adhesives. The only type of adhesive which has been found suitable for adhesion to these hydrophobic surfaces is a pressure-sensitive adhesive carrying a removable backing, or a "Scotch Tape" type pressure-sensitive label. This type of label is costly and, therefore, its use is limited to certain specific applications where cost is not important.

This problem is particularly prevalent in the application of labels to prescription ware made from hydrophobic material such as polystyrene. In most cases, the druggist who affixes the label to the container writes or types the dosage and descriptive matter on the label and applies the label to the container carrying the prescription. In carrying out this procedure, it is highly desirable to use labels which do not have a pressure-sensitive adhesive applied thereto.

Druggists do not all prefer the same system of labeling—some prefer to adhesively secure the label to the exterior of the container, while others prefer to place the label on the inside of the container so it can be read through the transparent wall of the container.

In order to render the hydrophobic surface of these hard plastic materials receptive to water-soluble adhesives such as those commonly used in the druggist industry, it has been found suitable to coat the surface of the containers with a hydrophilic coating composition which will adhere to the surface of the container and also to the adhesive on the label. The coating must be transparent and colorless so that a label placed inside the container can be easily read from the outside.

An object of this invention is to provide a container having a hydrophilic coating placed thereon to render the surface of said container receptive to the adhesive carried by the label, regardless of the type of water-soluble adhesive used.

Another object of this invention is to provide a container having a hydrophilic coating placed thereon, which hydrophilic coating is transparent, colorless, and free of taste and odor, and will not deleteriously affect the surface to which it is applied.

Other objects will be obvious from a reading of the following specification.

One of the most suitable coating compositions for carrying out this purpose is comprised of a solution of partially hydrolyzed polyvinyl acetate, denatured alcohol, and ethyl acetate. The partially hydrolyzed polyvinyl acetate resin is dissolved in a suitable solvent, such as methyl acetate, making a solution containing approximately 28% of the solid polyvinyl acetate resin. This resin solution is then added to a mixture of 75% denatured alcohol and 25% ethyl acetate.

In this formulation the polyvinyl acetate resin serves

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as the coating composition and the ethyl acetate is included to balance the system to produce optimum coating characteristics. Due to the fact that the acetate solvents in the formulation would have a deleterious etching effect on the polystyrene container, the denatured alcohol is included to inactivate this etching action.

In order to prevent blushing when the coating is applied to the container, a quantity of diacetone alcohol is added as an antiblushing agent. If it should be found desirable to inspect the coated containers to determine if a satisfactory uniform continuous coating has been applied, this can be easily accomplished by adding a small amount of fluorescent dye to the coating composition. This dye will be receptive to ultraviolet light and inspection can be carried out in the conventional manner.

In the selection of a resin suitable for the purpose of producing this coating, the degree of hydrolysis is important. If the degree of hydrolysis is too low, poor adhesion of the labels to the container will result. If the degree of hydrolysis is too high, the coating will become cloudy and is therefore unsatisfactory. The adhesive properties are satisfactory with completely hydrolyzed polyvinyl acetate, but the coating produced thereby is too cloudy when it dries on the surface of the container. It has been found that best results are obtained when a polyvinyl acetate resin is used which has a degree of hydrolysis ranging between 10% and 20%.

In selecting the solvent for the resin, it is important to select one which will be driven off at a temperature below the temperature at which the material of the container will start to deform or distort. In the case of currently available polystyrene, this critical temperature is in the neighborhood of 160° F. The methyl acetate solvent used in the above example is satisfactory for this purpose, inasmuch as it may be rapidly driven off at temperatures below the temperature at which polystyrene will deform or distort.

A suitable formula for a coating of this type is as follows:

	Percent by weight
28% polyvinyl acetate solution in methyl acetate—	
degree of hydrolysis of polyvinyl acetate, 14% ..	17.7
2B denatured alcohol	53.5
Ethyl acetate	21.9
45 Diacetone alcohol	6.0
3% "Primaline" concentrate in water (fluorescent dye)	.9

The above formulation produces a coating containing approximately 5% polyvinyl acetate resin by weight.

Several means of application are available for this type of coating, such as brushing, spraying, dipping, wiping, etc. However, it has been found that satisfactory results can be obtained on cylindrically shaped containers by placing them on a rotating mandrel and passing the rotating mandrel past a pad saturated with the coating composition. The pad should be as wide as the band of coating composition to be applied to the surface of the article and of sufficient size that the container will make at least a complete revolution while passing over the pad so that the container will be coated around its entire circumference. After the coating has been applied, the containers are placed on a conveyor and conveyed past an ultraviolet light which shows, by the presence or absence of fluorescence, whether or not a uniform and continuous coating has been applied to the containers. After inspection, the coated containers pass through a heated chamber, where the coating is dried. It is important that the temperature in the heating chamber be held below the temperature at which the plastic material from which the containers are made softens or distorts.

It will be clear from the above that I have developed a composition for application to transparent containers such as polystyrene prescription containers which will not deleteriously affect the surface of the container and which will remain transparent and which may be dried without deforming or distorting the plastic material from which the container is made. This coating will adhere to the surface of the container and also will permit water-activated gummed labels or labels coated with water-soluble adhesives to firmly adhere to the coated containers.

I claim:

As an article of manufacture, a container comprising a body of polystyrene having applied thereto a coating formed from a solvent system comprising partially hy-

drolyzed polyvinyl acetate in a mixture of alcohol and ethyl acetate and a label adhered to said coated surface by a water-soluble adhesive.

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