



Best Practices in Glass Recycling

Removing Label Adhesives in a Bottle-Washing Program

Material: Container Glass

Issue: *Historically, label adhesives used by bottlers were designed for easy removal so that bottlers could recover their own bottles through local buy-back programs and wash the containers for re-use. With most bottle-washing programs discontinued, and in response to marketing and operational considerations, many have converted to more convenient and durable label adhesives. These adhesives, which include press-applied and plastic labels, pose a major barrier to successful bottle washing because they do not readily come off in the caustic baths used in bottle washing machines.*

Best Practice: Several strategies may help to mitigate the problems associated with more durable label adhesives. The best way is to convince bottlers to use washing-friendly labels. This should be part of an overall marketing plan for the bottle-washing program (see *Elements of a Bottle-Washing Program Best Practice*). Second, understanding the fundamental technology of label adhesives makes it possible to develop strategies for resolving difficulties with durable label adhesives.

There are several primary glue types, including wet glues, high release dry glues, and press-applied adhesives (i.e., self-adhesive labels). Wet glues are water-based, and easily release in hot caustic solutions. Press-applied labels, however, are more durable and may actually strengthen their bonds in response to heat, preventing them from releasing when washed. Since most bottle washing equipment uses a pressure wash of hot caustic solution to clean and sterilize bottles, this is a significant issue for bottle-washing operations.

It may be necessary to use equipment that submerges the bottles in a caustic solution for an extended period, rather than just spraying them. In addition, it may be necessary to modify the temperature, time, and caustic level of the soak to weaken the adhesives sufficiently for removal. Of course increasing all of these parameters also adds costs to the operation.

Unfortunately for bottle washers, the trend is toward the use of press-applied labels for several reasons. First, wet-glue labeling equipment generally costs more than press-applied labeling equipment, despite wet glue equipment's lower variable costs of operation. Second, condensation has less effect on press-applied labels. When bottles are filled with cold liquids, condensation immediately forms on the outside of the bottle. High release dry glues cannot be applied over condensation. Wet glues can be applied, but the quality of the label placement is not as good as that achieved with press-applied labels. Condensation during subsequent storage and handling can also shift wet glue labels.

There are certain special adhesives which can be used with press-applied labeling systems that would allow removal in the hot caustic solutions used by bottle washers, but very few producers are interested in using

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hem because of cost. Ninety percent of new labeling machines in the wine industry now use press-applied type labels. Thirty percent of new labeling machines in the micro-brewing industry use press-applied type labels. With micro-brewing a potential market for bottle washing, and with the use of press-applied labels less common but growing, it will be important to monitor this industry.

Some bottles also come pre-labeled from glass companies, either with press-applied plastic labels or with applied ceramic labels. These labels pose the most serious issues for bottle washing due to the impervious label surface preventing penetration of the caustic solution. In addition, recent developments in container coatings mean that more bottles will have either applied ceramic labels or sprayed-on clear plastic coatings, neither of which can be used in bottle washing programs, further complicating label removal.

Implementation: The problems discussed above enhance the idea that bottle washing might most effectively be undertaken by either wine or beer producers' cooperatives. Producer cooperatives receive some unique tax considerations from the federal government and would have a vested interest in cooperating fully with each other on labeling issues. However they are structured, bottle-washing programs must be tailored to existing markets, usually a concentration of breweries or wineries, in order to achieve a critical mass of both washable bottles and final sales.

Benefits: The ability to remove label adhesives is critical to the viability of any bottle-washing program. There must be a comprehensive knowledge of the containers the program will handle and the label adhesives being used. Laboratory testing of the tenacity of the adhesives under simulated bottle washing conditions, followed by pilot production, will help to determine the feasibility of a full-scale operation.

Application Sites: Bottle-washing operations, bottling companies.

Contact: For more information about this Best Practice, contact CWC, (206) 443-7746, e-mail info@cw.org.

References:

A Model for a Bottle-Washing Program, ReTAP, Clean Washington Center Report GL-93-8, 1993.
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