

Translation of the original Document



Influence of the Glass Wax complementary treatment of bottles on the foam behaviour of the washing machine

Research report

1) Introduction

The company G.B.P. Glass Bottle Process in Gries (France) offers a product and a treatment process for the beverage packaging industry where returnable glass bottles are recovered in order to mask the superficial scratches (called scuffing strips) and so to reconstitute an improved bottle optic.

The process is very simple. The embellishment effect on used bottles is indisputably recognisable, especially when bottles are made of brown or green glass: the bottles are conducted in the exit cogwheel of the labelling machine through a forced rotation to sponge strips soaked with the treatment product which applies it on the side of the bottles. After drying, a nearly invisible film remains on the surface of the bottles which masks the scratches visually.

The *Glass Wax* treatment product presents an approximately 15% aqueous paraffin emulsion from which it remains after drying a few milligrams wax on the bottles (maximal 10 mg according to the manufacturer data, depending to the type of bottles and the size of the application surface). This wax is completely removed through the washing in the washing machine after the bottle is returned, because the hot alkaline solution washing leads to the softening and removal of the wax remains. The removed wax is thus introduced into the different washing machine baths, which could lead to a supplementary pollution in organic matter.

It is common knowledge that organic matter can lead to foaming problems in the alkaline washing baths, and that is why washing in a high rated modern washing machine with averages up to 100,000 bottles / hour can generally not work problem free without adding a special defoaming agent. That is why particular attention must be paid to the use of special organic matter, regardless of their sources (drink rests, paste, labels, various impurities). In a targeted way with a film of wax applied on the bottles, a new type of organic "pollution" is brought in the washing machine baths, whose consequences on the alkaline solutions and the washing behaviour of the installations have not yet been systematically studied.

The first question is to know if the wax remains present in the washing process disturbs the behaviour of the foam, or cause unexpected reactions with the additives of washing products.

2) Material and method

68 returnable beer bottles treated with the Glass Wax product were used (24 x 300 ml longneck brown glass, 24 x 250 ml green glass, 20 x 50 ml NRW brown glass).

The immersion tests were carried out in a 20 litre stainless steel heating bath with temperature adjustment.

For the foam tests, a lab pumping equipment was used, in which 3 litres of alkaline solution were pumped in circulation in a glass cylinder in which the foam formation on the alkaline solution could be observed.

Reduced model of alkaline solutions:

a) Presoaking bath:

0.5% NaOH
0.5% Carbonate of sodium
in demineralised water
Temperature 65 °C

b) Main bath:

2.0% NaOH
0.5% Carbonate of sodium
0.2% additive R
0.05% defoaming agent
1.5% beer
0.03% paste in casein

3) Tests and results

a) First of all, it had to be examined if the treated bottles do not already give off masking wax during presoaking and prespraying. As the bottle presoaking of the washing machine already removes a great part of the rough sticky dirt and dried rests of the beverage, alimented by different turns of the washing machine, and also leads to the sewage as an overflowing tank, it can be assumed that a large part of the removed waxes is already "drained off".

24 treated bottles were totally immersed in a 20 litre reduced model presoaking bath (see above) at 65 °C for 5 minutes, and then rinsed with warm water and dried in the air.

After drying, the bottles were visually examined.

All the scuffing strips on the bottles reappeared again white and visible. Remains of complementary coating wax were no more visible. The "Glass Wax" treatment product" had apparently completely dissolved.

The presoaking bath was a little unclear, but no other traces were visible. Above all, the alkaline solution did not show framing of hydrophobic contained matter. An identification of the concentration of the removed covering matter was not yet possible because of the missing analytic.

b) The influence of the “Glass Wax” product was also studied in the main bath, because of a suspected transmission from the presoaking bath to the main bath through the adherence on the bottles carriers, mobile pieces of the machine and bottles.

3 litres of main alkaline solution was studied in special renewal equipment in which the quantity of foam could be visually estimated, regardless of the pollution through the complementary treatment product. The tests were first carried out and evaluated with freshly added alkaline solutions without adding the “Glass Wax” product, then after adding the product. The foaming of the alkaline solution was in every case caused by the addition of paste and beer (see above). The results are summarised in the table below:

Additive	Defoaming	Foam formation		Miscellaneous
		Without	With	
		100 ppm Glass Wax		
WEICOPUR-A	RIMAGENTS-K	Moderated	Little	Unclear solution
WEICOPUR-B	Without	Much	Moderated	Clear solution
WEICOPUR-E	Without	Little	Little	Unclear solution
WEICOPUR-AS	Without	Much	Little	Clear solution
WEICOPUR-FL	RIMAGENTS-K	Little	Little	Unclear solution
ADDILIN-HS	RIMAGENTS-K	Little	Very moderated	Slightly unclear solution

The test results clearly show that the presence of the “Glass Wax” product leads to an absorption of the foam. It clearly does not increase foam development or diverse visible traces of the alkaline solution such as unclearness or disruptions.

These lab tests prove that the “Glass Wax” product will rather act as a foam absorber than a foam intensifier, depending on the amount of foam in the main bath of a bottle washing machine. No incompatibility with other contained matters of the alkaline solution could be noticed, and no peculiar side effects in the bottles washing process are to be expected through the use of this product.

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