

Reference documents for the HACCP risk analysis when closing bottles with the Vinolok glass closures:

In order to evaluate the risks of using Vinolok closures in bottling and closing lines in customers' plants, tests of mechanical resistance of stoppers have been ordered from the Testing Institute VLB Berlin.

The program of tests has been chosen so as to simulate the conditions of actual employment of stoppers in a bottling line, however requiring in all cases that the loading may simulate higher loads than the ones which can take place in practical use in a bottling line.

The results have been compiled in the Test Report from VLB Berlin No.: VP-PB-445/12 z 24.8.2012.

In the following, we present comments to the individual tests:

Item1 **Drum test:**

- The test aims to simulate the conditions of alignment of stoppers in a vibration bin at the beginning of the line – resistance of glass pressed piece provided with sealing ring
- During the movement of 30 pieces of tested stoppers in a revolving drum for a period of four hours, no stopper was damaged – conclusion: the risk in practical employment of stoppers is negligible – actual time of movement of a stopper under similar conditions is lower in the level of orders



Item2
Test on an inclined table:

- The test aims to simulate the conditions in the skidding lane to the bottling point
- On a level inclined under angle of 45 degrees, the stoppers skidded on a lane 1m long, bumping one into another
- From 50 tested stoppers, none was damaged – conclusion: the risk in practical use in the line is negligible



Item3
Drop test:

- The test aims to simulate the conditions when placing stoppers in bottle necks, when the stopper may collide with the neck
- The closures fell on the neck from a height of 150 mm – with 20 stoppers, no stopper or neck suffered damage – conclusion: the risk in practical use is negligible



Item4
Closing the bottle with closure:

- The test aims to simulate the conditions when pressing the stopper into the neck if the stopper is fitted properly, as well to simulate inaccurate seating of the stopper, when it is seated on the edge of the neck, and a closing force of 1,000 N is applied
- The result of the test of 20 stoppers has shown that both stoppers and necks withstand even such conditions safely – conclusion: the risk during practical use of the stopper is negligible, the maximum force pressing the stoppers in the neck being 500 N



Item5
Storage load test:

- Standard test performed on the closures to verify the tightness of their sealing after previous application of a load on the closure of 45 kg
- Result of the test – after being loaded for seven days, the stoppers did not show any leaks



Item6
Test of resistance to side impact:

- Simulation of conditions that could occur by a side collision of closed bottles at the point of the closure
- A steel ball weighing 43.42 g falls from a height of 770 mm upon the closure of a bottle, closed by the closure VINOLOK without a fixation element (shrink foil or Alu-cap), inclined by 30 degrees from the horizontal plane
- Result of the test – from 10 closures tested in three points, no glass closures or bottle necks suffered any damage – conclusion: the risk of damage in practical use is negligible.



The results of the tests also are confirmed by the practical experience of users of the Vinolok system. From the point of view of mechanical resistance, customers have not detected any problems with the use of closures in bottling lines.

Annex: Report of VLB Berlin No.: VP-PB—445/12 of Aug 24, 2012