



## SUMMARY OF ALL TESTS

### BACKGROUND

- Provisor Pty Ltd was engaged by ZORK Pty Ltd to conduct third-party, independent tests of the performance of ZORK Version 1 (V1) and Stelvin® screw-cap closures, when used to seal a 2003 vintage Riesling wine. Chemical, physical and sensory analyses of the wines were conducted at monthly intervals for the first six months. Some of the chemical and all of the sensory tests were repeated at 10, 12, 18, 24 and 38 months.
- This work was supplemented by further specific tests of other improved versions of the closure.
- Since the primary trial commenced, the ZORK closure has undergone several design and manufacturing changes, and the commercially-available closure is now V5. The changes were shown to have primarily improved the closure's resistance to pressure and leakage. Recent trials have shown the OTR of the new versions is similar to that of V1 and it is unlikely that the recent design changes have affected the sensory performance of the closure.
- Cork & screw cap comparisons have been drawn from the primary closure trial and other published data.

The combined results have been tabulated. For simplicity and clarity, generalisations have been made.

Closure type	Natural cork	ZORK V5	Screw cap	Synthetic 'cork'
				
<b>OTR (cc/day)</b>	Variable (0.081 – 0.0179)	Low & consistent (0.0078)	Very low & consistent (0.0002)	Ranges & consistent (0.01 – 0.09) <sup>1</sup>
<b>Free SO<sub>2</sub> loss</b>	Variable	Low & consistent (after O <sub>2</sub> in plunger consumed)	Very low & consistent	Dependent on individual product
<b>Shelf life (yrs)</b>	3-10+ (variable)	4–5 (estimate)	10+	1-4 <sup>1</sup>
<b>Sensory (general)</b>	Variable development	Oxidative development	Reductive development	Oxidative development
<b>Taint potential</b>	Yes (principally TCA)	No	No	No
<b>Scalp</b>	Possible	No	No	Dependent on individual product <sup>2</sup>
<b>Storage &amp; Handling of bottled product</b>	Horizontal & robust	Horizontal or vertical & robust	Horizontal or vertical & susceptible to denting	Horizontal or vertical & robust
<b>Shelf-life of unused closure</b>	Normally 3 months	Indefinite	Indefinite	8–12 months
<b>Temperature limit (Failure mode)</b>	~35°C (cork pushes)	>40°C (cap vents)	~38°C (cap distorts)	~35°C (plug pushes)
<b>Application</b>	Fast & reliable	Fast & reliable	Fast & reliable	Fast & reliable
<b>Extraction</b>	Corkscrew required	Open by hand	Open by hand	Corkscrew required

Notes: 1. Dependent on individual product  
2. Capone, D.; Sefton, M.; Pretorius, I.; and Høj, P. (2003) Flavour 'scalping' by wine bottle closures – the 'winemaking continues post vineyard and winery. Aust. New Zealand Wine Ind. Journal. 18: 5; 15-20.

- Provisor 18 month test report number PR05117 December 12, 2005
- Provisor OTR test report number PR06105 – January 27, 2006
- Provisor Pressure test report number PR05103 – July 7, 2005
- Provisor Transport & Storage test report number PR06106 – February 2, 2006
- Provisor Thermal test report number PN05103 – July 7, 2005
- Provisor ZORK 38 month analysis PR 07 017 – July 2007

Note: Please contact ZORK for detailed results of each test.

The rigour applied to the independent evaluation of the ZORK exceeds most commercial trials and parallels benchmark closure research. I am encouraged by the performance of ZORK in the trial. ZORK is a closure deserving serious consideration by winemakers.

