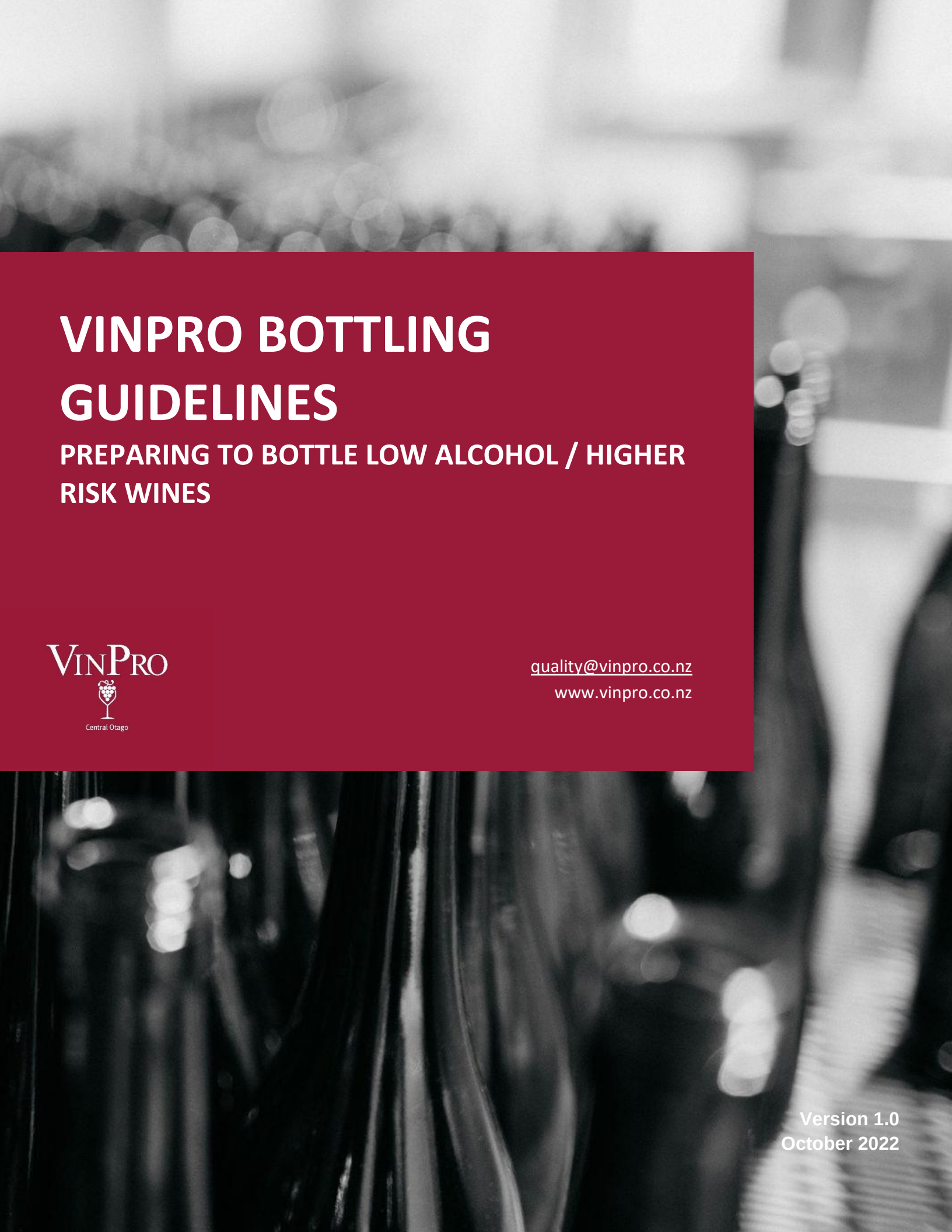

VINPRO BOTTLING GUIDELINES

PREPARING TO BOTTLE LOW ALCOHOL / HIGHER RISK WINES

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Background

These guidelines have not been documented or designed to provide advice on viticulture, vineyard management or winemaking techniques. The intent is to highlight the risks of lower alcohol wines and outline the parameters that can be taken to guarantee stability in the bottle. The ultimate goal is to provide wine to the consumer in the best and safest possible state.

VinPro has been working with local winemakers, using published information from the AWRI (Australian Wine Research Institute) and using already established criteria within the NZ Wine Industry to create these guidelines for preparing lower alcohol wines for bottling in order to achieve guaranteed micro stability.

This is a growing subset of the wine market in Central Otago and we envisage these guidelines being utilised increasingly by participants making these types of wines to provide a benchmark of good practice that is derived from independent, authentic and validated science, based on strong data for the good of the industry, in which numerous parties in NZ and Australia have contributed.

Low alcohol wines

An easy way to define low alcohol wines, are any wines with an alcohol content lower than the typical industry range of between 12% abv – 15% abv. So, for the purposes of these guidelines and linked to our VinPro Food Safety Standards, any wines with an alcohol content between 5% abv and 12% abv would be considered “low alcohol”.

Risks in bottle

One of the biggest concerns is the increased risk of secondary fermentation or spoilage in-bottle, due to the lower alcohol levels. We need not be overly concerned about this provided the winemaking protocols recognise the specific risk that low-alcohol wines can present.

Molecular SO2

The equipment and methods used to bottle wine around the world are very similar and rely on the use of sanitary, clean, sterilised equipment, and micro-filtration to a level of 0.45 micron. However, this is not classified as Aseptic or Sterile filling, and the environments in which we bottle do not meet this standard either.

We rely on the inherent properties of the wine (low pH/high acidity, high alcohol, free SO_2 etc) to assist in the prevention of any chance for secondary spoilage. When the alcohol is lower, our reliance on molecular SO_2 is increasingly critical. Therefore, we need these wines presented ready for bottling with the ph and free SO_2 relationship correct to deliver a **molecular SO_2 level of 0.8ppm**. In the case of wines that are low alcohol and/or high sugar (+25g/l rs), then a molecular SO_2 of 1.2ppm is safer and recommended. This level has been widely researched and is accepted as being lethal to all micro-organisms (pathogens, bacteria, yeast and moulds).

We know that many fermentative yeasts can operate in a “normal” wine environment, so when alcohol is lower, this risk is greatly increased, and this is where the molecular SO_2 will “underwrite” the integrity and shelf-life of these wines.

Dissolved oxygen effects (DO)

Our current bottling practices and management of dissolved oxygen typically deliver a pickup of less than 0.5mg/L and there is no reason this should change for low alcohol wines. Refermentations however will happen faster in a higher-oxygen environment.

Summary Chart – Molecular SO2 & pH

pH	% molecular SO_2	Free SO_2 (mg/L) required for **0.6mg/L** molecular SO_2	Free SO_2 (mg/L) required for **0.8mg/L** molecular SO_2
2.90	7.5	8	11
2.95	6.6	9	12
3.00	6.1	10	13
3.05	5.3	11	15
3.10	4.9	12	16
3.15	4.3	14	19
3.20	3.9	15	21
3.25	3.4	18	23
3.30	3.1	19	26
3.35	2.7	22	29
3.40	2.5	24	32
3.45	2.2	27	37
3.50	2.0	30	40
3.55	1.8	33	46
3.60	1.6	38	50
3.65	1.4	43	57
3.70	1.3	46	63
3.75	1.1	55	72
3.80	1.0	60	79
3.85	0.9	67	91
3.90	0.8	75	99
3.95	0.7	86	114
4.00	0.6	100	125

VinPro SO2 Guidelines

Wine Style	**Molecular SO_2** Link to AWRI Molecular SO2 calculator
Red wine with malic acid = 0g/l, RS below 25g/l	0.5 mg/l
White wine with alcohol above 11% abv and/or RS below 25g/l	0.8 mg/l
White wines with alcohol lower than 11% abv and/or RS above 25g/l	1.2 mg/l
High pH wines (red >3.65, white >3.45)	Pre bottling Free SO_2 above 30 ppm

Responsibilities

VinPro – the bottler

The bottler's responsibilities when bottling normal wine are to provide a clean environment that a wine with normal levels of alcohol (over 12%) will remain microbially stable at. We know from experience that there are elevated levels of risk in bottling low-alcohol wines that wine-bottling machinery and procedures cannot always prevent. This includes the bottles, closures, gases and environment, which are not (and cannot be) sterile.

We commit to:

a) Deliver clean, sterilised wine contact surfaces in our plants.
b) Demonstrate the integrity of the 0.45 micron final filtration, where you have specified ‘sterile’ filtration.
c) Prove a) and b) by sample analysis through micro-plating.
d) Apply industry standard house-keeping and Dry Goods handling regimes to mitigate environmental spoilage risks.

The Winery and Winemaker

Our inline sterile filters (0.45micron) will guarantee the wine is sterile as it enters the filler. That does not remove the risk of yeast ingress from the not sterile inputs such as bottles, caps or the environment post filling. To ensure the wine is protected from this possible ingress, free SO2 levels need to be at appropriate levels

From you, our client, we request:

a) The understanding that wine bottling is not an aseptic, sterile process.
b) The understanding that the properties of the wine are a key part of the microbial “hurdles” in the bottling process.
c) That any low alcohol wines (<12% abv) delivered for bottling are inherently microbiologically stable, have a molecular SO_2 of between 0.8 and 1.2ppm, or use sorbate or some other preservative of your choice.

On the rare occasions when molecular SO_2 levels are not within the range above, we will contact you immediately to discuss the most practical next steps. In cases where the wine is deemed low risk (e.g. Pinot Noir with no residual sugar or malic acid) it is likely that by mutual agreement we will continue to bottle. Where the wine is deemed high risk based on low alcohol, high sugar, or other factors, the options are to add more sulphur before bottling or for the client to agree a waiver accepting that they are comfortable with the risks being highlighted and would like to proceed. The intent will always be to safely bottle the wine through a pragmatic and constructive conversation about what is best for the wine.