Supplier Quality Management: Corks

DANNY MACMAHON
J.B. Macmahon Pty Ltd

Introduction
This paper discusses the quality parameters that J.B. Macmahon controls for the processing and treatment of raw corks at its plant in Australia. This covers the processing of cork from receipt of raw material in containers, in-process production controls and final inspection and testing prior to despatch. J.B. Macmahon also tests for other quality parameters (over which it does not have direct control) including: grading, critical and non-critical faults, dimensional characteristics and taint. The Quality Management Systems which help to ensure that control is maintained for the production of treated cork are also discussed.

Cork quality parameters
The quality parameters controlled in the end product at JBM are:

1. Moisture
2. Dust
3. Printing
4. Treatment

Moisture
Cork moisture is important as it affects the elasticity of the cork. We believe an optimum level of moisture in cork is between 6 and 8%, so we aim for 7%. This keeps the cork from being too brittle, with the risk of the cork’s cell structure breaking down, or the cork being too damp and therefore spongy. Dampness is also an element in the development of TCA.

- Moisture is checked:
  - at receipt of raw cork in bales, as we prefer to store corks in a dry state (approx 5%)
  - prior to moisturizing, where we lift the moisture of the cork by addition of distilled water to an average of 7%
  - prior to treatment; if corks are below specification (<6%) they are re-moisturised, or if they are too moist they are dried out, prior to treating

Dust
Loose cork particles and dust are removed from the cork to minimize any residual dust/particles falling into the wine during bottling.

Prior to moisturizing and printing, corks are dedusted in a tumbler. Cork samples are taken after de-dusting and tests carried out on a daily basis to check performance of the machine.

Print
If corks require printing, samples are taken at the beginning of the printing run for Quality Assurance to check that the print quality is satisfactory. The operator checks the print quality every 15 minutes to ensure print quality performance. Corks after printing are stabilized for approximately 2 days to allow the print to cure.

Treatment
Corks are treated to ensure ease of insertion during bottling, that a seal is maintained between the cork and the bottle, that the force required to extract the cork is at an optimum level and to preserve the cell structure of the cork. Corks are treated at the final stage of production once corks are dedusted, printed and moisturized.

- After treatment a sample of corks is taken from each batch of 5,000:
  - 5 for sensory evaluation
  - 12 for treatment tests
  - 3 for extraction

The treatment tests ensure that the treatment level of the corks falls within our standards (based on the CITCOR issued June 1972) which are as follows:

- 38 × 24mm corks - 13–15 mg per cork
- 44 × 24mm corks - 16–18 mg per cork
- 49 × 24mm corks - 18–21 mg per cork

As extraction forces are directly related to treatment quantities, we also check the extraction levels of each batch of cork. Corks which are correctly treated should fall within the following specification with a minimum variance.

- 38 × 24mm corks 230–400 newtons
- 44 × 24mm corks 250–450 newtons
- 49 × 24mm corks 270–480 newtons

On every cork job, a rapid heat test is performed to test for potential wine travel. We subject 6 bottles of wine, corked and left standing for 12 hours, to 38°C for 6 hours in an incubator.

Despatch
Corks which are ready for despatch are held until all information from these tests has been collated by Quality Assurance. No corks are despatched until they have passed all QA requirements.

Other elements which are tested for at different stages of production but which we do not control include:

1. Grading and evaluation of critical and non-critical cork faults
   Grading and cork faults are checked at receipt of raw cork according to the classifications defined in the Australian Wine Industry Straight Cork Guidelines issued 1984.

2. Dimensional Characteristics
   At receipt of raw cork it is checked against stated dimensions with an allowable tolerance of ± 0.4 mm for diameter and ± 1 mm for length.

3. Taint
   Every batch of 5,000 corks is tested for taint prior to release. 5 corks are placed in a jar of neutral wine and sealed for 12 hours. The wine is independently assessed by 3 experienced personnel for any taint based on the following scale:

0 = No Taint
1 = Just Perceptible Taint
2 = Slight Taint
3 = Moderate Taint
4 = Strong Taint
(0–2 = Pass, 3–4 = Fail)
If corks pass all the tests carried out on each batch they are approved for release. If corks fail any of the quality parameters we have established they are held in quarantine. If it is related to:

Treatment: corks are either retreated or disposed of.
Taint: corks from affected batch are retested, if OK they are released; if they fail on the second test they are disposed of.
Extraction: related to treatment
Wine Travel: related to treatment and moisture
Moisture: checked in process and modified if required
Print: checked in process and modified if required

Quality management systems to ensure control is maintained
The J B Macmahon Quality Management system features that ensure the process and quality controls are maintained include the following.

1. Document control
All procedures and work instructions in the cork plant are documented and authorized as this ensures consistency within the system. All paper flow and computer usage from receipt of order to despatch of goods is documented and all quality records are documented on control documents.

2. Product traceability
We have established procedures for identifying the product during all stages of production and delivery, therefore we can trace back any carton through the treatment process to an individual bale of cork and when it was received. From this we can refer back to the supplier.

3. Corrective /preventative action
If products/processes fall out of controlled limits there is an internal reporting procedure to change (modify procedures/systems) where possible, in conjunction with the customer.

4. Quality audits
Because J B Macmahon’s Quality Management System has been accredited under A S 3902, both internal and external (by third party) audits are undertaken monthly to ensure processes and records comply with the written procedures and to ensure the effectiveness of the quality system.

5. Staff training
All personnel in cork production are retrained every 12 months on cork production procedures.

6. Calibrated test equipment
All equipment used in inspection and testing which directly affects the outcome of the product is calibrated regularly.

Conclusion
Due to the number of companies involved in the cork production process from sourcing raw cork bark to supplying treated cork, companies treating cork in Australia cannot directly control all cork quality parameters. To ensure cork quality the Australian cork suppliers must, however, source their raw cork from reputable cork companies which have stringent quality control procedures.