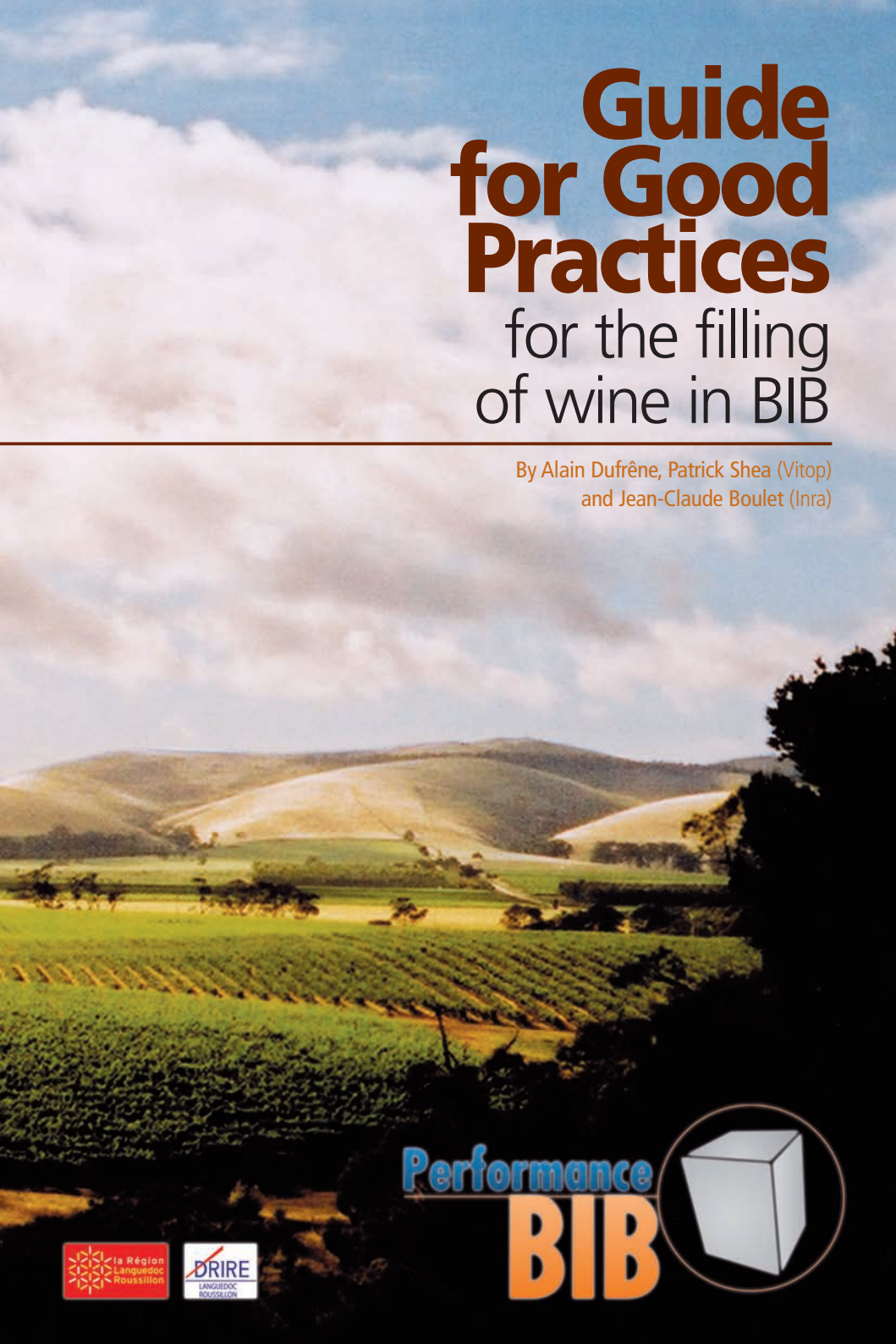
Guide for Good Practices

for the filling of wine in BIB

By Alain Dufrêne, Patrick Shea (Vitop)
and Jean-Claude Boulet (Inra)



SUMMARY

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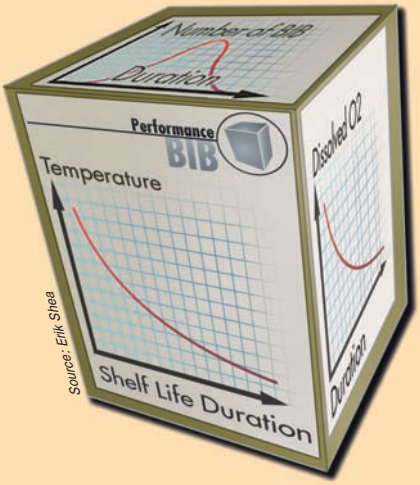
Document published by **Performance BIB** Site: *www.b-i-b.com* e-mail: *performance@b-i-b.com* layout and editing: **PCA+**, Montpellier (France) Technical coordination: **Intersection Communication**, Montpellier (France) Printing: Imprimerie **Arceaux 49**, Montpellier (France) Initiative supported by the **Languedoc-Roussillon Region** and the **Drire LR**

Quality **challenge for the Performance BIB group**

KEY POINTS

- **Unique industry reference**
- **Applied BIB research supported by the Association**
- **54 leading firms share their know-how**



Why this Guide?

THIS *Guide of Good Practices* is the result of work conducted by Performance BIB since 2004. In addition to the professional experience of the authors, it integrates the knowledge of its members (gathered through a questionnaire on existing filling practices), research work supported by the Association and a number of bibliographical references.

The list of contributors is far too long to enumerate but the authors wish to particularly thank Philip Bailey, André Laville, Bénédicte Nicolini, Aurélie Peychès, Jean-Claude Vidal and Laura West for the pertinence of their suggestions, as well as the members of the Governing Board of the Association, who were willing to share this knowledge with a wider audience.

This *Guide of Good Practices* is not meant to replace the various good practices codes (see reference section 5.3.1) for the wine trade which already exist in various countries. Indeed, these codes give advice on the management of vineyards, the making and bottling of wines, and on hygiene maintenance. BIB filling

practices, how-ever, are only seldom included.

Thus, we have considered it necessary to map out Good Practices adapted to this type of package, our chief objective being to increase the shelf life of BIB wines. By definition, a Guide of this sort can only provide general recommendations and does not take into account the specific conditions relating to each company.

This document is meant to be as didactic as possible and provides the reasons that justify each recommendation. Staff training and understanding of the basic concepts are essential for the good execution of the various stages of BIB filling, where the constraints are different than with bottles. We will not mention the problems already described in the various other Codes and will assume that they are already under control by the filling centres.

Top priority: Improve the shelf-life of BIB wines

We must remind you that it is each company's responsibility to make sure that the adopted Practices correspond to their specific conditions and to the **legal requirements of each country**.

Source: Gandia

Neither the authors of the present document nor the Association Performance BIB will be held responsible for the consequences of the application of these recommendations.

Wines being a foodstuff, the usual recommendations for such products apply regarding the filling zone (no cigarettes, rodents, etc.).

Mention of the shelf life is required in certain countries. Similarly, an erroneous indication of the shelf life printed on the box can constitute an offense.

BIB fillers behind the Performance BIB initiative, and without a doubt all of the participants in the program, are motivated by the idea of improving wine filling for this type of packaging. These

improvements will be made possible through the better professional practices found in this Guide, but hopefully also through progress in films, taps and equipment.

Paradoxically, now that we are preoccupied with this concern to improve, certain retailers are applying increasing pressure on fillers to cut costs, by reducing if necessary the quality of the package and/or wines, consequently reducing the shelf life - while we already find it to be insufficient.

We therefore believe that the moment has come for all of the serious actors in the BIB sector to mobilize so that Quality remains a top priority.

Some of our members have already suggested that we rally behind a Quality Label which would be only given to the companies that respect the *Guide of Good Practices* and which would inspire the confidence of serious distributors.

Perhaps in the near future, this Guide will want to go further in defining a minimum quality level for the package and equipment in order to reach a degree of confidence such that insurance companies will agree to better cover certain risks, as is already done in the field of aseptic bags.

Resist pressure to reduce the quality of the package

We can only hope that BIB, a rising and relatively recent star in the otherwise difficult wine sector, can continue its remarkable path, further prompted upwards by industry rigor and professionalism. ■

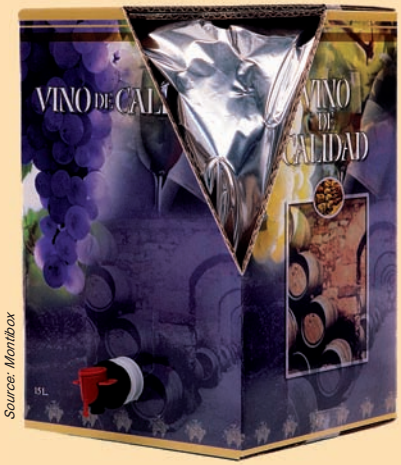
Landscape with vineyards as seen from the conference room at the Barossa Valley Resort during the Performance BIB meeting in Australia in November 2004 (part of this photo used for cover).

What is a BIB?

BIB, abbreviation of Bag-in-Box®, also referred to as "cask wines" or "box wines", appeals to a growing number of wine consumers. It is also well adapted to a number of other liquid or semi-liquid food applications, including milk, sauces, liquid eggs, sauces and fruit concentrates.

Clean and ingeniously designed, this system is available in package volumes from 2 to 20 litres. Once opened, it keeps the wine fresh for a long time – therefore allowing wine drinkers to spread out consumption over a longer period.

The BIB is composed of a **flexible bag** composed of multilayer oxygen barrier films, a **gland** (called also "spout" or "flange", welded to the film), a **tap** (through which the wine is poured, inserted in the gland) and a **box** (affording both protection and support for visual communication aimed at the end consumer).



Source: Montibox

The Performance BIB Association

NOT less than 54 firms, leaders in the BIB filling and packaging industry, issued from 19 countries and five continents, united together to form the Performance BIB research group.

This non-profit making Association (Executive Committee: Annouk Arzoumanian, Olivier Reggio and Myriam Negre Caroff) is financed by its members as well as by a grant from the Languedoc-Roussillon Region (France).

Its main focus is to improve the quality of BIB wine offered to the final consumer through supporting applied research and promoting the exchange of technical information.

Performance BIB web site:
www.b-i-b.com
e-mail: performance@b-i-b.com ■

Control **dissolved oxygen at its source**

KEY POINTS

- **An extra milligram of dissolved oxygen per litre reduces shelf life by one month**
- **Select options which reduce levels of dissolved oxygen**
- **Good preparation of wine before filling**

Source : Alain Dufrêne

VARIOUS studies show that oxygen introduction must be controlled throughout the wine making process but also during later wine handling, tank transfers and pumping. This proves to be of great importance when one seeks to preserve the organoleptic properties of BIB-filled wines.

1-2. Knowledge from the Performance BIB Study

Results from our research project (INRA) have shown that a high level of dissolved oxygen in wine filled in BIB has a clear negative impact on the colour (for white wines), on free SO_2 and on total SO_2.

In the example of the BIB wine chosen for the study (Chardonnay), stored at 20°C, with a low rate of dissolved oxygen to begin with (<1 mg/l) and a level of free SO_2 of 45 mg/l and if we estimate that this same wine will not be well protected against oxidation if the level of free SO_2 goes lower than 15 mg/l, then we can observe that the addition of 1 mg/l of dissolved oxygen prior to filling reduces the wines shelf life by almost 1 month.

A wine having 4 mg/l of dissolved oxygen prior to filling will

see its shelf life reduced by almost 3 months relative to a wine that only has 1 mg/l.

Concerning **equipment to measure dissolved oxygen** and precautions to take during measurements, see the references cited in section 5.3.2.1. ■

Source: Smurfit Kappa Bag-in-Box Italia

1-2. Recommendations concerning equipment

THE equipment selected should be that which minimizes the introduction of oxygen.

- **Positive displacement pumps** should be preferred to centrifugal pumps (see references cited in section 5.3.2.2).
- **Tanks that allow the use of inert gases** to protect the wine will be preferred.
- **Filtration being a critical point**, the method used will have to take into account, as much as possible, the risks of oxygen introduction.
- **Connections** must be perfectly tight. No leak, even the occasional drop, should be tolerated. The fact that the equipment is pressurized does not prevent air from getting in through the Venturi effect as soon as rapid wine flow occurs. ■

Pressure in a system does not exclude air entry

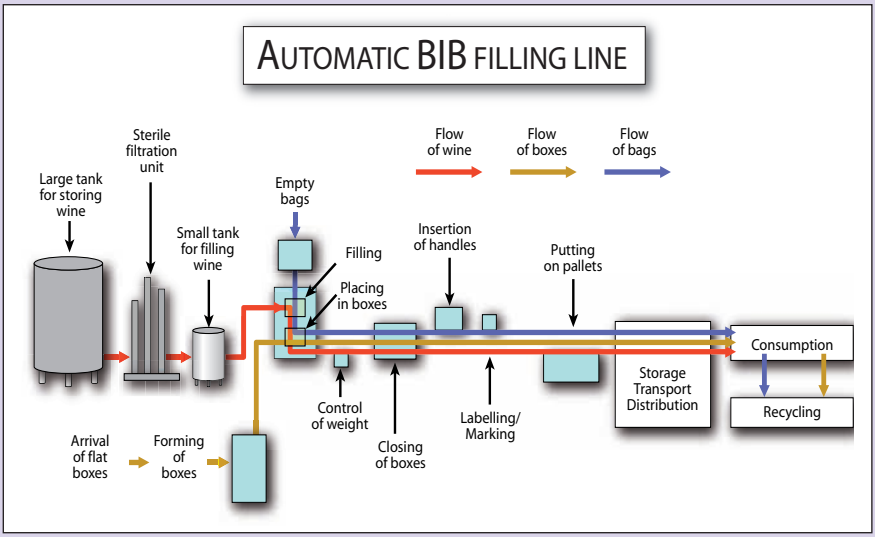
1-3. Recommendations concerning work methods

A basic rule for all wine packaging is that the wine be in contact with air (and thus oxygen) the least amount of time possible, especially when wine is flowing. Any stirring of the wine in contact with air must not occur.

This rule is not specific to BIB. The amount of oxygen consumed by the wine after filling is a direct function of the amount of dissolved oxygen at filling plus the amount of oxygen which will have penetrated through the package (film or tap).

Because BIB is more permeable to oxygen than a glass bottle and its closure, it is even more important to pay attention to minimizing the level of dissolved oxygen during the BIB filling process. Given its importance, we will remind you of several critical points:

- Do not operate **pumps** when cavities (spaces) have formed in the wine that is being pumped.
- Pay attention to the **filling of storage tanks**, which should occur from below, and to the emptying of the tanks when a vortex can form, drawing in gases.
- Be aware that **physical treatments**, such as tartrate stabilization via **cold temperatures** (although often necessary) can also increase levels of dissolved oxygen since the **dissolution of gases in wine becomes greater** as the temperature decreases.
- As **any intervention on wine** should be done as much as possible in the absence of air, the use of inert gases in wine transfer circuits is advisable. Likewise, drainage of the installation should be flushed by an inert gas.
- **Rigorous and preventive maintenance** must be set up on all the elements that are critical oxygen-wise: the joints of tank doors, hoses, pumps, etc. must be regularly changed. Likewise, circuits related to inert gases must be regularly tested to ensure that they are not contaminated by air. ■



Source: Vitop

1-4. Recommendations for wines that are to be filled in BIB

BECAUSE the physical properties of the materials making up the bags differ to those of bottles, a few extra precautions might have to be taken.

All stirring of wine in contact with air should be avoided

■ **Choice of the wine**. The characteristics of the wine are important determinants of its capacity to resist oxidation and the growth of micro-organisms. A low pH (high acidity) results in a higher level of molecular SO_2, which is the active form in preventing microbiological growth.

■ low ratio of Free SO_2/Total SO_2 may indicate that the wine has already had a past history of SO_2 addition and combination. Wine shelf-life will generally be longer if the pH is low and the ratio Free SO_2/Total SO_2 is high.

■ **The Performance BIB study** noted that free SO_2 fall during the weeks which follow filling is always higher with BIB than with glass bottles. Generally the initial level of free SO_2 is slightly higher for BIBs, especially in the case of fragile wines. It is frequent to observe rates of 40 to 50 mg/l, even higher in the case of wines shipped over long distances.

One must respect the food additive laws for each country and not forget that sulphites are in the limelight and that their reduction is envisioned in certain countries because of their allergy provoking effects.

Mix the SO_2 well added prior to filling. Lack of proper SO_2 mixing is still observed in the field. This problem is perhaps amplified because greater SO_2 is sometimes added to BIB wine than for bottled wine.
It is important to measure and record SO_2 levels, including after adding additional amounts.

The use of **other additives**, commonly found in wine, poses no BIB-specific problems, except for CO_2. Indeed, an excess of CO_2 can cause problems with the boxes when the package undergoes a rise in temperature.

Gases that were dissolved in low temperatures will come out of the wine in gas form, forming a bubble whose volume is added to that of the wine. Boxes, for which the inside volume is fixed, will then inflate and deform.

In practice, a rate of 1000mg/L of CO_2 is not to be exceeded and 600 to 800 mg/L if higher storage temperatures are anticipated.

An excess in CO_2 can be treated by inert gas bubbling.

The oxygen which penetrates into the BIB results in a decrease in free SO_2 and the wines become less protected against the growth of micro-organisms. The presence of residual sugar will increase the risk. Consequently, sterile filtration of wines that contain residual sugar is essential.

Certain precautions relative to the physical properties of the films used

The development of Brettanomyces **yeast** is occasionally observed in some packaged wines. This produces flaws linked to the production of volatile phenols (such as ethyl-4-phenol) and these flaws are sometimes mistakenly attributed to the package, being described as yielding a "plastic" taste or odour.

The prevention of this risk implies their elimination (via filtration or thermal treatment), maintaining high enough free SO_2 levels and sterilizing the filling machine.

There may be a need to focus more research on the roles of **Copper** and **Iron** in the oxidation phenomenon (see Reference section 5.3.2.3).

Acetaldehyde (or "ethanal"),

present in the wine, might also require more attention since it may contribute the observed fall in free SO_2.
This analytical parameter could be taken into consideration, along with the level of dissolved oxygen, when explaining the rapid fall of free SO_2 during the days following filling. ■

Performance **Achieving acceptable filling line Performance**

KEY POINTS

- **Conceive of the filling line as a controllable process**
- **Give particular attention to wine transfer circuits**
- **Improve work methods to assure total quality**

Source: Jean-Claude Boulet

2-1. Knowledge from the Performance BIB study

THE injection of inert gas at the end of the filling cycle results in a decrease (from 16% to 11%) in the level of dissolved oxygen in the air cone, when measured right after the insertion of the tap in its gland

This decrease in dissolved oxygen levels in the air cone was apparently too small, however, to have a measurable impact on the quality of the wines. ■

2-2. Recommendations concerning equipment

2-2-1 Materials

All materials, including lubricants, in **contact with the wine** should be approved for food use and should be able to be sterilized.

2-2-2 Circuits

Good engineering practices must be respected regarding **circuit design** and production (tapping, welding, etc.) as well as **component choices** in order to avoid so-called "dead zones", which are sources of contamination. Ease of cleaning and sterilization must be a priority.

2-2-3 Wine intake

- All **joints** must be inspected so as to guarantee a total absence of leaks.
- **Wine pressure** and incoming **flow rate** must be well adjusted for precise dosage.
- A system to prevent against the **water-hammer effect** (surge resulting from a sudden change in liquid velocity) must be installed to protect the joints of the filling heads and the filtration cartridges.

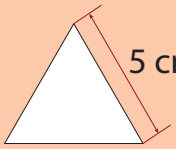
Source: Montibox

A rigorous set of guidelines for the filling machine

- The **pump which pushes the wine towards the filters** must be set according to the average flow rate of the line and not according to the instantaneous flow rate at the filling head. This makes it possible for it to work without interruption (a cause of oxygen introduction, see Reference section 5.3.2.2) and results in less pressure surges during filtration. It is also a way of avoiding the overuse of by-pass (obligatory on positive-displacement pumps) which can cause harmful stirring of the wine. After filtration the wine should be channelled into a buffer tank under neutral gas. Wine pressure on the outlet side of the buffer tank should be constant and regulated, taking into account the possible variations in the wine level. This buffer tank can be used to prevent the water-hammer effect if it is very close to the filling machine.
- **The filling machine** must:
  - Create a vacuum in the bag before filling in order to prevent foaming and to limit oxygen introduction into the wine.
  - Achieve proper sealing between the gland and the filling head.
  - Have an adjustable table so as to obtain the smallest possible gas bubble in the bag. The length of the air cone generator (line) should be monitored and adjusted if necessary. An objective to achieve might be 5 cm or less for a BIB of 3 or 5 litres.

Diminishing the volume of the cone allows one to reduce the volume of oxygen trapped in the bag

but a certain volume may be necessary to prevent spillage at the end of the filling process.



It should be noted that the analyses carried out by Performance BIB seem to show that the bubble which forms in a bag filled with a CO_2-loaded wine is, at equal volume during filling, relatively rich in CO_2 and low in oxygen. This may be due to a partial degasification of the wine during filling which might form a protective gas cloud in the gland - replacing the air normally present above the wine.

- Allow the injection of an inert gas at the end of filling
- Be easy to clean inside wine circuits as well as outside. Zones where wine spill retention can occur must be avoided.
- Have a sterile liquid joint on the filling head piston which prevents air intake in the event of a joint failure.
- Be designed in such way that no contaminated drop from condensation or foreign element can fall inside the bag before tapping. Drops of wine on the bag are to be avoided (risk of mould etc.).

■ **The packing of the bag in the box** must be done under conditions which minimize film crumpling, with a minimum of physical aggression from falls, frictions, contact with abrasive surfaces and other objects which might damage the film.

Continually applying proper rules of hygiene and machine maintenance

■ The **gluing of the boxes** after bag insertion should be done in such a way that no part of the film gets stuck between the flaps and no glue point should touch the film. ■

2-3. Recommendations concerning Work Methods

2-3-1. Systematic recommendations:

■ The **cleaning and sterilization** of the entire wine circuit, from the tank to the filling machine, must be carried out before the beginning of each filling session.

■ External **cleaning of the entire filling area** should be done before each fill run and after each incident having caused a wine overflow or splashing inside this area.

■ The **first bags filled** will be discarded due to too much dissolved oxygen, especially if inert gases are not used to flush the circuits.

The use of inert gases to protect the wine and to push it through the circuits will decrease the number of oxygen-rich bags.

Regular dissolved oxygen measurements will make it possible to know how many bags to discard, the number of which varies depending on the equipment used.

Monitoring of the line, of its circuits but also of persons in the area

■ All **persons** who are in contact with the filling machines must follow strict rules relative to body hygiene.

■ The **amount of wine filled** inside the bags must be monitored and corrected in accordance with applicable regulations.

■ A **complete cleaning** of the filler should be carried out at the end of each run.

2-3-2. Recommendations for optimization

■ The use of **inert gases** inside the entire wine circuit is recommended so as to eliminate any air (and thus oxygen) present in piping before sending the wine through. Pushing the wine with the use of a neutral gas can also sometimes replace a pump.

■ **Dissolved oxygen controls** should be done inside wine storage tanks, before in the filling machine, and in the filled bags.
An abnormally high rate of dissolved oxygen is a sufficient reason to stop filling.
This test makes possible, among other things, the detection of an air intake somewhere along the line.

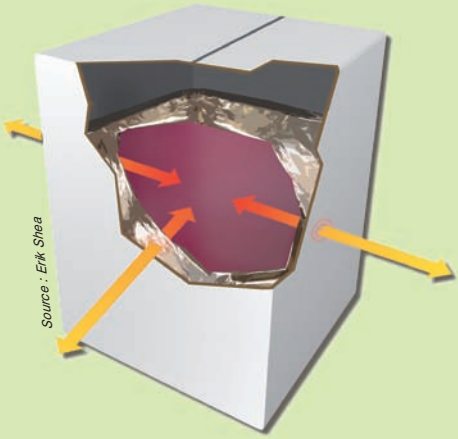
■ **Microbiological sampling** should be done on the first bags filled. New analyses may be justified during a fill run - after a line stop for example.

The results of these analyses and sample bags should be kept for several months to create a database useful in the event of a subsequent complaint. ■

Bags and boxes **Adapting the container to the contents**

KEY POINTS

- **Watch out for misleading laboratory results for oxygen permeation**
- **Determine and verify package dimensions**
- **Apply recommendations for control and storage**



3-1. General Recommendations

3-1-1. Relative to oxygen permeation results

Among the various types of films and taps currently available on the market, the choice will be made depending on a number of parameters, including the type (truck, rail or ship), duration and conditions (humidity, temperature, etc.) of transport.

But be aware that laboratory values based upon gas/gas oxygen permeability are not representative of real-life gas/liquid situations, and depend greatly upon on the test conditions chosen. Therefore field tests are necessary to confirm a choice of materials.

Performance BIB is sponsoring research into gas/liquid oxygen permeability measurements that can better predict wine shelf-life but for the time being, no method is considered as acceptable. ■

3-1-2. Master flex-cracking

Box dimensions and the quality of the inner paper have a great influence on flex-cracking and film wear, so one should follow the following recommendations:

- A **non-abrasive paper** should

be chosen for inside the box to limit wear on the film.

■ The **inside dimensions of the box** determine the level of freedom of movement of the bag and thus contributes to the level of flex-cracking. The internal volume of the box should be approximately equal to the nominal volume of the bag plus 0.5 litres.

■ The **dimensions of the bag** should also be well adapted to the form of the box. Assume that Lc = horizontal length of the box in cm,

Calculate the dimensions of the bag which fits the box

wc = side width of the box in cm, hc = height of the box in cm.

To calculate the dimensions of the bag in cm, apply the following rules: The length of the bag = wc + hc and the width of the bag = Lc + wc + 1.

■ Beware of **inks and varnishes** which can alter the taste of the wine.

3-2. Specific Recommendations

■ **Package supplies** should be kept under **controlled conditions** to avoid extremes in temperature or moisture.

■ The **storage duration** of empty bags should be as short as possible, and should not exceed, under any circumstances, the duration recommended by the supplier.

■ Operators should randomly **control bags** at reception or before filling so as to detect such defects as air trapped between film layers, gland or film welding flaws, de-lamination, etc.

■ The **boxes** should be controlled to verify **dimensions** as how well the **sides are put together**, especially the **absence of edges likely to cut** or wear out films. ■

High storage temperatures
The great enemy of BIB

KEY POINTS

- **Low temperatures preserve the organolpetic qualities of the wine**
- **Reduce handling of package to a minimum**
- **Apply Just-in-time production with minimum stocks**

Source: Aran

4-1. Knowledge from the Performance BIB study

High temperatures are detrimental to the wine BIB shelf life.

Results from our research project (INRA) demonstrate that (like for high levels of dissolved oxygen) high temperatures also have a clear **negative impact on the colour** (for white wines), on **free SO_2** and on total SO_2.

In the example of white wine (Chardonnay), stored at 20°C in BIB, with a level of free SO_2 of 45 mg/l and if we estimate that this same wine will not be well protected against oxidation if the level of free SO_2 goes lower than 15 mg/l, then we can observe that an increase in temperature of 10°C (Storage therefore at 30°C) reduces the shelf life of the wine by almost half (from 8 months at 20°C to 4 months at 30°C).

Several studies on other forms of packaging have also shown that low storage temperatures best protect the organoleptic qualities of the wine. ■

4-2. Recommendations

- **Shelf-life tests** for a period of 6 to 12 months should be conducted with sample bags taken during filling, preferably at a temperature sufficient to speed up the wine ageing process.

If these bags are not subject to transport stress then one might assume that the shelf-life observed through these tests might be less than in real distribution channels. Performance BIB is working to develop recommended shelf-life test procedures.

- When regrouping boxes are not used, **pallets** should preferably be prepared with sheets (often cardboard) between each row to improve stability and reduce the constraints on BIBs close to the edges.

When a different stacking procedure is used for every other row, these sheets also serve to reduce alignment induced problems.

- The **amount of loading/unloading** undergone by the pallets should be reduced to the bare minimum.
- Storage should take place in areas **exempt** from all products that could communicate an off-taste or odour.
- The **temperature of the storage location** should be kept as low as **possible**. Maximum temperature < 25 °C (Recommended 20°C).
- Ideally, these conditions should be maintained **throughout the supply chain**.
- BIB is not designed to store wine over a period of several years. Filling centres should **apply just-in-time production methods** and carry minimum stocks. BIBs should be filled relative to customer orders and shipped quickly. ■

Prospects: **A further BIB boom backed by solid research**

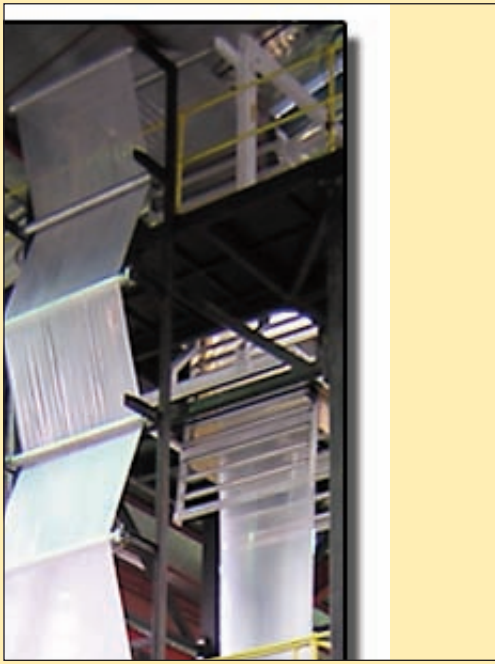
5-1. General Recommendations

FOR each of the methods described, any intervention made on the wine or the filling line, any incident, any analysis done, etc., must be recorded in order to ensure complete traceability as well as to respect the legislation of various countries. ■

5-2. Conclusions

WITH Oxygen being the common point in a majority of the problems related to the shelf life of BIB wines, one realizes that oxidation which occurs as result of causes before the fill run are relatively well-known and often controllable by means of a well adapted methodology, provided in part by Performance BIB.

However, oxidation which occurs as a result of causes after filling are not well-understood and calls for new studies in order to understand, for example, how oxygen actually gets inside the bag when the film is in the presence of wine on one side and air on the other.



Source: Maverick

When all of the information comes in from the 2006-2008 research programs, perhaps it will be seen that in the current state of things we have much more to gain from a further change in working conditions rather than waiting for improved packages. Or it may be the other way around! We will see. ■

5-3. Codes and References

5-3-1. Existing Codes

These are the references of several existing codes:

- **France.** — *Guides de bonnes pratiques hygiéniques - Filière vins*, Editions des Journaux Officiels, 26, rue Desaix / 75727 Paris cedex 15, fascicule N°5909
- **Europe.** — *A Voluntary Code of Practice for the Packaging of Wine. See also Bulk Shipping et Traceability*. Available from The Wine and Spirit Association of Great Britain, (44)207 248 5377. www.wsa.org.uk. E-Mail: info@wsa.org.uk. The European Federation of Wine & Spirit Importers and Distributors.
- **New Zealand.** — *Code of Good Manufacturing Practice*. Reeves and Fraser 1995.
- **Australia.** — *The Code of Good Manufacturing Practice for the Australian Grape and Wine Industry*. www.awri.com.au/infoservice/publications/Publication%20PDFs/WR163The.pdf

  The Australian Wine Research Institute - PO Box 197, Glen Osmond, SA 5064 Australia

5-3-2. References

- **5.3.2.1** Dosage de microquantités d'oxygène dans less vins par Michel Moutounet et Jean-Pierre Mazauric, Feuillet Vert de l'OIV, N° 1085, 2000 and Méthodologie de la mesure de l'oxygène dans less vins par Jean-Claude Vidal, Source: Inra Pech Rouge, Gruissan, 2006.

- **5.3.2.2** less apports d'oxygène au cours des traitements des vins. Bilan des observations sur site, 1re partie, de Jean-Claude Vidal, T. Dufourcq, Jean-Claude Boulet and Michel Moutounet, Revue française d'œnologie, September/October 2001, N°190.

- **5.3.2.3** Review of reaction mechanisms of oxygen and proposed intermediate reduction products in wine: central role of iron and copper, John C. Danilewicz, 2003. American journal of Enology and viticulture. 54:2. ■

5-4. Members of Performance BIB

- **Ackerman Rémy Pannier** (Filling, France)
- **Andrew Peller Limited** (Filling, Canada)
- **Amcor Flexible** (Packaging, Denmark)
- **Aran Packaging** (Packaging, Israel)
- **Arcus** (Filling, Norway)

General Meeting of Performance BIB in La Rochelle, France on 27 November 2006

- **Cartobol** (Packaging, Spain)
- **Castel** (Filling, France)
- **Cellier des Chartreux** (Filling, France)
- **Concha y Toro** (Filling, Chili)
- **Conotainer** (Packaging, Spain)
- **Conro Precision** (Packaging, South Africa)
- **Constellation Europe** (Filling, UK)
- **Corby Bottlers** (Filling, UK)
- **Dow** (Packaging, Germany)
- **DuPont Liquid Packaging Systems** (Packaging, UK)
- **Fiée des Lois** (Filling, France)
- **Flextainer** (Packaging, France)
- **Friedrich** (Filling, France)
- **E. & J. Gallo** (Filling, USA)
- **Hardy Wine Company** (Filling, Australia)
- **Institut Coopératif du Vin** (Laboratory, France)
- **Industri-bag** (Packaging, South Africa)
- **Inter-Rhône** (Filling, France)
- **Jacques Wein-Depot** (Distribution, Germany)
- **Jeanjean** (Filling, France)
- **JF Hillebrand** (Transport, Scandinavia)
- **Les Chais Beaucairois** (Filling, France)
- **Les Chais du Sud** (Filling, France)
- **Les Vignerons de la Méditerranée** (Filling, France)

- **LGR - Reine** (Packaging, France)
- **Maverick** (Packaging, South Africa)
- **Montibox** (Packaging, Spain)
- **Nampak Flexibles Cape** (Packaging, South Africa)
- **Napiag** (Packaging, Austria)
- **Origin Service** (Filling, South Africa)
- **Orlando Wyndham** (Filling, Australia)
- **Parsat Vins** (Filling, France)
- **Pernod Ricard** (Filling, France)
- **Plasticos Vicent** (Packaging, Spain)
- **Quinn** (Filling, UK)
- **Rapak** (Packaging, UK)
- **SAQ** (Distribution, Canada)
- **Scholle** (Packaging, Netherlands)
- **Smurfit Kappa** (Packaging, France)
- **Southcorp Wines** (Filling, Australia)
- **Systembolaget** (Distribution, Sweden)
- **Technibag** (Packaging, France)
- **V&S** (Filling, Sweden/Danemark)
- **Vincor** (Filling, Canada)
- **Vinobag** (Filling, France)
- **Vitop** (Packaging, Italy)
- **Vlachos Bros** (Packaging, Greece)
- **Worldwide Dispensers** (Packaging, UK)
- **Yalumba Wine Company** (Filling, Australia)