

FOR ENOLOGICAL USE



## Practical booklet

Sparkling wines

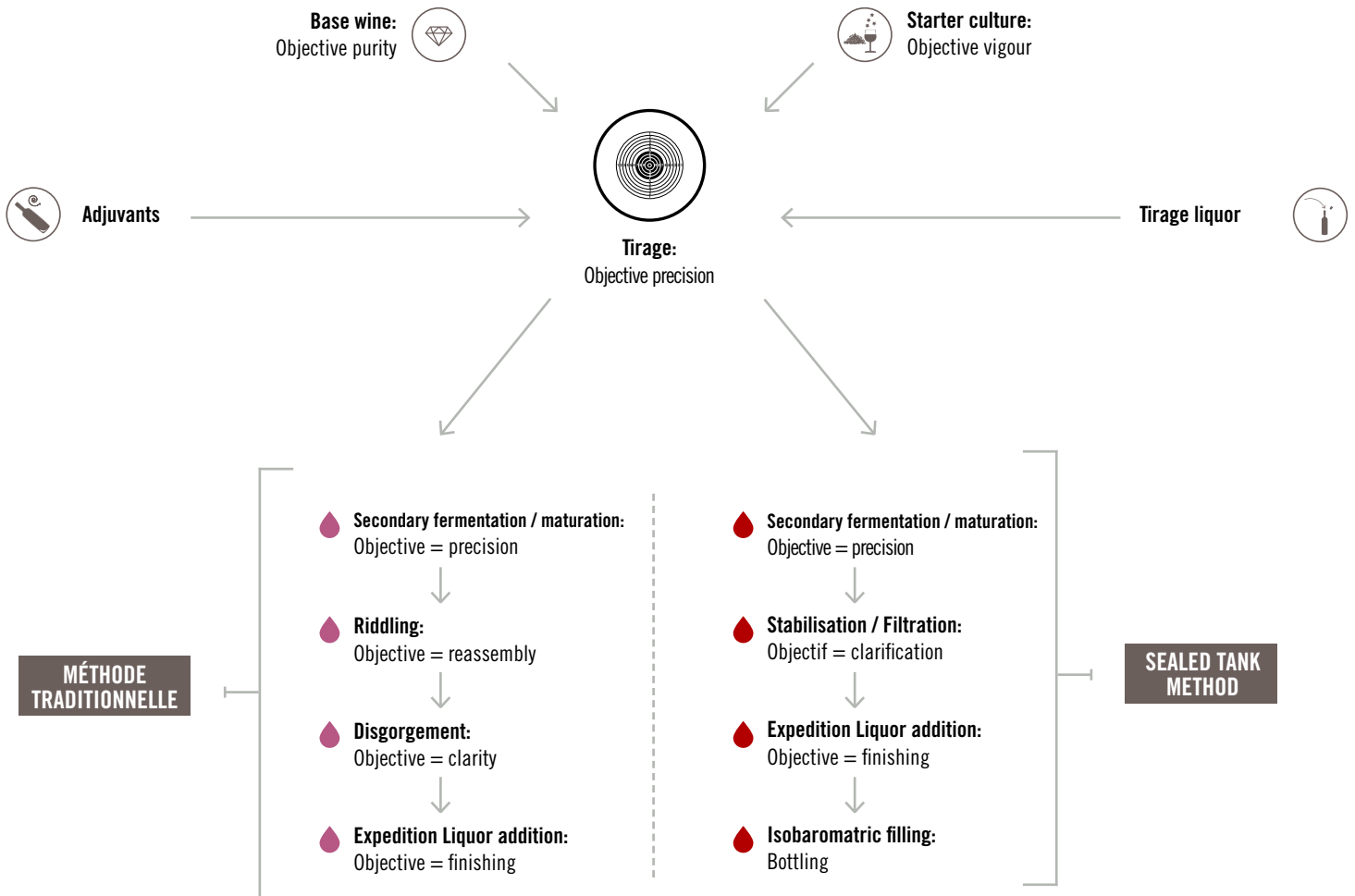


# SPARKLING BOOKLET - E2F

The production of sparkling wines is even more technically demanding than for still wines. Our new E2F® range has been developed to meet your technical and oenological requirements.

This practical booklet is designed to accompany you throughout the preparation and creation of your cuvées, for a range of clearly defined final product-types. The format of the booklet follows the standard protocol for sparkling wine production, for both «méthode traditionnelle» and sealed vats methods. Through this booklet, Lamothe-Abiet gives you everything you need to make your sparkling wine a great success.

### BASICS FOR THE PRODUCTION OF SPARKLING WINES:





## BASE WINE: OBJECTIVE - PURITY

All bubbles have their base wine. One common denominator: the quality and purity of the aromas



### Pressing: A key step for a successful base wine.

- **Separate the first juice (that is released under its own weight, and the very first pressing):** high level of fatty acids from the grape skins, harmful for the mousse quality.
- **Separate** the free-run juice from the press juice.
- **Tools to guide the separation of the juices:** smonitoring conductivity, dissolved O<sub>2</sub>, tasting.



### Clarification and extraction: this step can be optimised by using enzymes. Opt for purified enzymes (FCE)

- Novoclair® speed, Vinoclear® classic



### Must fining: a large range of fining products to choose from, according to your goals and constraints

- GreenFine® Must, Polymix® Natur', Clarfine®, Polymix®, etc.
- **Tanin gallique à l'alcool** (NB: gall nut tannins have a better effect on oxidases, the enzymes responsible for must oxidations, than other categories of oenological tannins).



### Yeasting: a yeast for each style!

- **Elegance and purity of aromas:** Excellence® E2F or Excellence® TXL
- **Fruit & freshness:** Excellence® STR ou FTH



### Yeast nutrition: essential to ensure a complete fermentation and to optimise the yeasts' performance

- **Yeast preparation:** Oenostim®
- **Activators :** Vitaferment®, Optiflore®



### Oak alternatives: bring sweetness and complexity

- Granulars, Copeaux et Sticks Oenobois®
- Go to [www.oenobois.com](http://www.oenobois.com) to discover our range.



**Malolactic fermentation:** in certain cases can be carried out for deacidification and/or microbiological stabilisation (which also facilitates riddling), as well as for its effect on the aromas. However, if you decide not to do it, be particularly attentive to avoid a spontaneous MLF during the secondary fermentation.

- Bactéries VP 41®, PN 4®



### Aroma protection: to ensure that aromas remain stable over time

- Aroma protect®, Aroma T'n'T®

**Protein stabilisation:** à should be decided by considering the instability and the positive impact of proteins on the persistence of the mousse. Must proteins, contrary to proteins released by yeasts during AF, are all unstable and do not enhance the mousse of sparkling wines. Furthermore, musts sometimes contain fatty acids from the grape skin. These are also detrimental to the quality of the mousse. It is therefore highly recommended to treat the must, and not the finished wine, with bentonite.

- **Bentosol protect®:** do not use more than 40 g/hL of bentonite if you are treating the base wine (rather than the must).

**Tartaric stabilisation:** to be determined according to the instability of the wine. It is essential to carry out prior laboratory tests.

### COMMONLY USED TESTS:

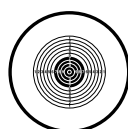
- Gold test
- Mini-contact test
- Saturation temperature test (TSat)
- DTI : Degree of Tartaric Instability
  - ▶ This test is essential for electro dialysis in order to determine the final conductivity that the machine must attain to ensure an acceptable stability.





## EXAMPLE OF TREATMENTS TO CONSIDER ACCORDING TO THE RESULTS OF A «SATURATION TEMPERATURE» ANALYSIS

RESULTS	TREATMENTS		RECOMMENDATIONS
TSat < 10°C	The wine is considered to be <b>stable</b> .		
10°C < TSat < 15°C	An <b>inhibitory treatment</b> can be used. This involves adding products which inhibit precipitations.	<b>Metatartaric Acid</b> Antitarte 40®	Ester of tartaric acid which inhibits salts precipitations.  Méthode traditionnelle : Add 100% of the dosage after disgorgement. Better to use on wines already stabilised (cold treatment or electrolysis). Suited to wines that are to be drunk young / sealed tank method.
		<b>Mannoproteins</b> Stab K®	Compounds enzymatically extracted from <i>S. cerevisiae</i> yeast cell walls. Inhibit the nucleation (creation) phase of crystals and thus prevent their precipitation.  Consult your oenologist.
		<b>Carboxymethylcellulose (CMC)</b> Vinoprotect®	Derivate of cellulose which acts as a colloid protector by inhibiting the formation of tartrate micro-crystals.  Méthode traditionnelle : 50% of the dosage at the tirage 50% of the dosage at disgorgement. Dose determined according to test results. Depending on the increase in TAV during secondary fermentation, a certain amount of the added gum may be inactivated. Consult your oenologist.
TSat > 15°C	Un <b>traitement soustractif</b> est recommandé. Consiste à éliminer les molécules responsables des précipitations (Bitartrate de K et Tartrate de Ca).	<b>Cold</b>	Keeping wines at a low temperature for a given time causes salts to precipitate. There are several types of cold stabilisation: - with or without cream of tartar addition - batch or continuous  On <u>base wine</u> .
		<b>Electrodialysis</b>	Selective removal (after measurement of the ionisation rate) of the molecules responsible for the instability by passing the wine between selective membranes under an electric field.  Effective on <u>base wines</u> with a deionisation % < 20%. If >20%, cold treatment is recommended.



## TIRAGE : OBJECTIVE - PRECISION

The tirage is the cornerstone of the sparkling wine to come and requires the upmost precision.

It involves putting into bottle (méthode traditionnelle) or tank (sealed tank method) perfectly homogeneously the 4 essential constituents for a good secondary fermentation:



**THE BASE WINE:** (see § Base wine: Objective purity)



**THE TIRAGE LIQUEUR**



**THE YEAST STARTER:** (see § Yeast: Objective vitality)



**THE RIDDLING ADJUVANTS** as well as secondary fermentation activators





## THE BASE WINE: (cf. § Base wine: Objective Purity)

**Key points to ensure the success of the secondary fermentation (SF):**

**TAV : high alcohol levels slow the growth of the yeast.**

Be aware of the potential TAV even before harvesting, knowing that the secondary fermentation increases the TAV on average by 1.3% vol.

☒ **In case of an excessive potential TAV**, there are some solutions:

- Stop the AF once TAV reaches 11% vol. (filtration, cold, etc.). The secondary fermentation can then take place with the residual sugars (majority of fructose -> be careful since this is harder for the yeast to assimilate than glucose). In this case, choose a «fructophilic» yeast (Excellence E2F®).
- Block (with sulphur) or filter a portion of the must then reincorporate it to the rest of the fully fermented wine. A base wine of 11% vol. can thus be obtained by dilution. The sugars will be made up of both glucose and fructose -> favourable for secondary fermentation.

**SO<sub>2</sub> : SO<sub>2</sub> can greatly disrupt the secondary fermentation.**

- The amount of active SO<sub>2</sub> must be less than 1.5 mg/L.
- Be sure not to add any sulphur less than 15 days before the tirage.

**pH : if too low, can disrupt yeast multiplication.**

- pH > 2,9.

**Dissolved O<sub>2</sub>: aids yeast development and growth.**

- Aim to add 1 to 2 mg/L, less than this you risk having reduction during the secondary fermentation.

**Assimilable nitrogen: preferably added in organic form.**

- **Optiflore®**: Rich in sterols and unsaturated fatty acids, its formulation helps yeast to resist and survive difficult conditions.



## TIRAGE LIQUEUR

**Sugar content:**

Fermentation of 4g/L of sugar will result in 1 bar of pressure at 10°C.

TAV OF BASE WINE (% Vol.)	AMOUNT OF SACCHAROSE NECESSARY FOR A PRESSURE OF:		
	5 BARS	5,5 BARS	6 BARS
9	19	21	23
10	20	22	24
11	21	23	25
12	22	24	26

(Source : Ribéreau-Gayon, *Traité d'œnologie, Tome I*)

- Wine sugar content before prise de mousse has to be around 24g/L. To be adjusted according to the base wine alcoholic content. Indeed this value is calculated for a 10% alcoholic content. For higher content, alcohol might dissolve part of CO<sub>2</sub>.

**Composition:** cane sugar, beet sugar or RCM (rectified concentrated must).

**Concentration :** around 500 g/L.

**optional: addition of tannins**

**TANIN E2F®** is a selection of gallic and egallic tannins.

- **Protective role:** A natural antioxydant, it blocks polyphenol-oxidases and improves the effectiveness of SO<sub>2</sub>.
- **Stabilisation role:** Causes unstable proteins to precipitate and protects the organoleptic qualities of the wine.
- **Organoleptic role:** Adds elegance and structure to white wines without astringency. Protects the organoleptic properties of the wine.





## YEAST: OBJECTIVE - VITALITY

The environment in which the yeast multiply and evolve during the secondary fermentation is particularly hostile: it contains alcohol, SO<sub>2</sub>, CO<sub>2</sub>, low pH, low temperature, confined/unmixed environment.

Therefore it is essential to make every effort to make a high quality yeast starter.

Lamothe-Abiet is with you every step of the way, with an example protocol for preparing a yeast starter.

### PROTOCOL FOR PREPARING A YEAST STARTER FOR TIRAGE - FOR 100 HL OF BASE WINE.

#### STEP 1 YEAST REHYDRATION

In 10L of water at 37°C +/- 3°C :

- Dilute 1 Kg of **Oenostim**<sup>®</sup>
- Add 1 Kg of **Excellence**<sup>®</sup> E2F
- Add 500g of sugars (or 1L of liqueur)

Leave to expand:

20  
MIN

#### STEP 2 ACCLIMATISATION TO ALCOHOLIC ENVIRONMENT

In the «rehydration» medium, add:

- 12 L of wine
- + 10 L of water
- + 3 Kg of sugar (or 6 L of liqueur)
- + 10 g of **Vitaferment**<sup>®</sup> PH

Pump-over with air 3 times/day  
Monitor the drop in density until 1015  
Keep the temperature at 20°C

12  
HOURS

#### STEP 3 FINAL STAGE

In the «acclimatisation» medium; add:

- 300 L of wine
- + 100 L of water
- + 45 Kg of sugar (or 90 L of liqueur)
- + 100 g of **Vitaferment**<sup>®</sup> PH

Pump-over with air 3 times/day  
Keep the temperature at 20°C  
Monitor the drop in density until 1000  
Possibility to modulate the temperature (down to 13-15°C) to finish with a Density=1000 on the tirage date.

2-4  
DAYS

### KEY POINTS FOR MAKING A HIGH QUALITY YEAST STARTER

#### 1/ A robust yeast: Excellence E2F<sup>®</sup>

- Resistant to alcohol, to pressure, to hostile environments, it produces a high quality mousse.

#### 2/ An optimal rehydration: Oenostim<sup>®</sup>

- Adds growth factors (vitamins, minerals) and survival factors (sterols, unsaturated fatty acids): increase the number of viable cells.

### 3/ Management of the starter:

5 to 6 days of preparation are necessary to follow all the above steps.

The starter must then be used as soon as possible. Too much preparation time (>15 to 20 days) can cause other problems:

- ◆ Risk of microbiological spoilages in the starter (especially bacterial contaminations).
- ◆ Increased levels of proteins in the yeast cell walls, leading to an increased risk of «sticky» deposits on the inside of the bottles during riddling.

### 4/ Dosage:

- ◆ The volume of starter should be 3 to 5% of the wine before the tirage.



#### RIDDLING ADJUVANTS

---

The following types of adjuvants can be added:

#### Mixtures of pure bentonite:

- ◆ easily neutralised by proteins, it is therefore necessary to check that the base wine is not too rich in protein. If it is, it is sometimes advised to increase the dosage of the adjuvant by 1 to 2 cl/hL. Si c'est le cas, il est parfois conseillé d'augmenter la dose d'adjuvant de 1 à 2 cl/hL.  
> **Bentosol Protect®**

#### Mixtures of bentonite-kaolin or bentonite-alginate:

- ◆ These are the most widely used. These bentonites, with low deproteinising ability, help to maintain the finesse and the persistence of the mousse, while also playing a role as a coagulant for the flocculation of elements in suspension in the wine. They lead to the formation of a compact deposit in the bottle, which is easily removed at disgorgement. The addition of a riddling adjuvant always guarantees successful disgorgement.  
> **L'adjuvant E2F®** offered by Lamothe-Abiet is a liquid formulation composed of bentonite and alginate. Recommended dosage: 7 to 10 cl/hL.

#### Key points for preparation and addition of adjuvants:

- ◆ These mixtures are likely to turn to gel immediately if added on their own to the wine. It is therefore highly recommended to first add them to the yeast starter or at exactly the same time as adding the yeast starter.
- ◆ It is not recommended to keep an adjuvant preparation from one day to another. It is a solution with a high pH and is therefore microbiologically unstable. The daily requirements should therefore be calculated as accurately as possible.

### THE SECONDARY FERMENTATION: OBJECTIVE - PRESSURE

---

#### Key points to control:

- ◆ **It is important to stir the tank well throughout the entire tirage process:** The mixture of base wine, yeast starter, tirage liqueur and adjuvants must be perfectly homogeneous to avoid any later difficulties (riddling problems through lack of adjuvant, sluggish fermentation due to lack of yeast starter, etc.).
- ◆ **Perfect hygiene of the tirage system in order to avoid any microbial contamination.**
- ◆ **Avoid heat shocks to the yeast during the tirage:**  
It is important to control the temperature of the wine, the starter, the bottles, and the air temperature when bottles are being transferred between storage and tirage (≈13°C).
- ◆ **Yeast population in bottle:**  
It is recommended to verify the addition of the yeast starter during tirage, with an ideal initial population in bottle between 1.5 and 2.10<sup>6</sup> cell/mL.  
Below this, the secondary fermentation may slow down or become stuck before it is finished.  
Above this, the fermentation will be fast but there is a risk of yeasty/reductive flavours and/or the aromas will lack freshness.
- ◆ **Importance of the temperature of the secondary fermentation site:**  
Ideally, the site would be held at a steady temperature between 15 and 18°C to guarantee the secondary fermentation (which should last between 40 and 45 days).  
After this, the bottles should be taken back to a site at 12-13°C to be kept in racks until riddling. Be aware that the fermentation may become stuck at a temperature below 12°C.



**Disgorgement**, in the méthode traditionnelle, involves removing the deposit which has been formed after the secondary fermentation and brought down to the neck of the bottle during riddling. This aim of this operation is to ensure the subsequent limpidity of the wine in the bottle.

A real signature of each sparkling wine, the **expedition liqueur** is the last change made to the wine as it is added in bottle after disgorgement (méthode traditionnelle) or before bottling (sealed tank method). It must therefore be prepared with care. It is made up of wine and/or grape must, with sugar, sometimes wine eau-de-vie and various other adjuvants.

**The addition of this liqueur will determine the category of the product (in g/hL sugar)**

CATEGORY OF THE PRODUCT	DOSAGE OF SUGAR (g/hL)
« brut nature » « undosed » « zero dosage »	< 3
« extra brut »	< 6
« brut »	< 12
« extra dry »	12 - 17
« sec »	17 - 32
« demi-sec »	32 - 50
« doux »	50

**Depending on the situation, the following can be added:**

- ◆ **Citric acid:** brings freshness and liveliness
- ◆ **Bisulfite solution:** microbiological protection and antioxidant
- ◆ **Ascorbic acid** ((only with a minimum of 10 mg/L free SO<sub>2</sub>):  
Antioxidant effect and limiting premature evolution
- ◆ **Gum arabic:** colloidal stabilisation and addition of roundness
- ◆ **Copper sulphate solution:** : limit reductive odours

