This stabilisation procedure, for wines aged more than 6 months, consists of adding a quantity of MANNOSTAB®/MANNOSTAB® Liquide which will inhibit the precipitation of potassium bitartrate. This quantity must be determined for each wine according to its natural native content of protective colloids and to defined stability criteria. As neutral calcium tartrate precipitations are difficult to anticipate, the MANNOSTAB® treatment does not guarantee inhibition with regards to calcium salts.

In all cases, Mannostab® treatment must be carried out with advice from an œnologist.

1- DOSAGE
Average doses are between 100 and 300 ppm (50 150 mL/hL of MANNOSTAB® LIQUIDE). They can be directly recommended by an œnologist according to wine ageing conditions (duration, temperature) or calculated exactly using stability tests (contact your laboratory or your Laffort representative). These tests must imperatively be carried out after racking or pre-filtration. Any operation which modifies the wine’s colloidal constitution modifies its tartaric stability and therefore negates any prior stabilisation treatment.

Example of determining dosage by the cold test:
MANNOSTAB®:
1. Dissolve 1.5 g of MANNOSTAB® in 40 mL of distilled water.
2. Add increasing volumes of this MANNOSTAB® stock solution to 375 mL bottles at the following levels: 0, 1.0, 1.5, 2.0, 2.5, and 3.0 mL. These volumes correspond to final MANNOSTAB® concentrations of 0, 100, 150, 200, 250 and 300 mg/L.
3. Make each bottle up to 375 mL with the wine to be stabilised.
4. Filter each sample under conditions as close as possible to those to be used for bottling (i.e. same filter porosity). In the case of wine which will be unfiltered at bottling, the sample must be in the same state of clarification as it will be at bottling.
5. Store each sample at -4°C/24.8°F for 6 days.
6. After 6 days’ storage at -4°C/24.8°F, if crystallisation has occurred in the control sample then make a note of the first sample in which there are no crystals. This sample will determine the stabilisation dose. If the control does not precipitate, the wine is considered stable.

- Results are easy to read in the case of white, rosé or dessert wines, by turning over the sample bottle and observing the presence of crystals.
- For red wines, it may be necessary to filter the samples after cold storage, the presence or absence of crystals on the membranes being used to determine the required stabilisation dose (use prefilters with 2.5 to 3 micron nominal pore size, the objective being simply to retain any crystals that may have formed).

MANNOSTAB® LIQUIDE:
the procedure is similar, except that the MANNOSTAB® LIQUIDE is added directly to the samples without the need to prepare a solution in step 1.

Equivalent treatment dose in volume of MANNOSTAB® LIQUIDE for a wine sample volume of 375 mL (use a micropipette).

<table>
<thead>
<tr>
<th>Treatment dose (mL/hL)</th>
<th>50</th>
<th>75</th>
<th>100</th>
<th>125</th>
<th>150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of MANNOSTAB® LIQUIDE to add to 375 mL of wine</td>
<td>187 µL</td>
<td>281 µL</td>
<td>375 µL</td>
<td>469 µL</td>
<td>562 µL</td>
</tr>
</tbody>
</table>
TREATMENT DOSAGE = STABILISATION DOSAGE + 5 g/hL (50 ppm).

Examples of Treatment Dosage determination with MANNOSTAB®:

<table>
<thead>
<tr>
<th>Wines</th>
<th>MANNOSTAB® doses tested (ppm)</th>
<th>Stabilisation dose</th>
<th>Recommended treatment dose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td>White/Rosé</td>
<td>****</td>
<td>***</td>
<td>**</td>
</tr>
<tr>
<td>Red</td>
<td>***</td>
<td>**</td>
<td>0</td>
</tr>
<tr>
<td>Sweet white</td>
<td>****</td>
<td>***</td>
<td>**</td>
</tr>
</tbody>
</table>

****: presence of crystals / 0: absence of crystals

2- IMPLEMENTATION

The addition of MANNOSTAB®/MANNOSTAB® LIQUIDE is carried out between preparation filtration and bottling filtration, at the latest the day before bottling.

After determination of the treatment dosage and MANNOSTAB®/MANNOSTAB® LIQUIDE addition, only SO₂, ascorbic acid or STABIVIN® (gum arabic) can be added to the wine.

Preparative method (if using MANNOSTAB®)

1. Dissolve MANNOSTAB® in 10 times its weight in water heated to 30°C/86°F.
2. Leave the preparation to stand for a few minutes until it is completely dissolved.
3. Incorporate this solution into the wine to be treated using a dosing pump or a Venturi system.
4. Fully homogenise the MANNOSTAB® in the tank (at least 1.5 volumes of the tank).

NON-FILTERED WINES:

MANNOSTAB®/MANNOSTAB® LIQUIDE must be added to the wine at the latest the day before bottling, following the preparative methods described above.

FILTERED WINES:

Good wine filterability is essential for a successful MANNOSTAB®/MANNOSTAB® LIQUIDE treatment procedure. Any blocking of the filtration media brings about modifications to the wine's colloidal structure and/or retention of MANNOSTAB®/MANNOSTAB® LIQUIDE and thus an immediate decrease in the treatment's efficiency.

1. The turbidity (NTU) and clogging index (CI) measures are essential for defining adequate filtration conditions.
2. The temperature of the wine during treatment and during bottling filtration must be above 15°C/59°F. Avoid all thermal shocks (temperature variations > 5°C/41°F) after bottling and for 72 hours post-bottling.
3. Filtration recommendations according to filterability indexes:

<table>
<thead>
<tr>
<th>FILTERABILITY ST ATE OF THE WINE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before MANNOSTAB®/MANNOSTAB® LIQUID ADDITION</strong></td>
</tr>
<tr>
<td>Turbidity &lt; 3NTU and IC &lt; 50</td>
</tr>
<tr>
<td>IC &gt; 20 and turbidity &lt; 3 NTU</td>
</tr>
<tr>
<td>Turbidity &lt; 5 NTU and IC &gt; 50</td>
</tr>
<tr>
<td>Turbidity &gt; 5 NTU</td>
</tr>
</tbody>
</table>

4. It is highly recommended to not exceed a pressure difference of 0.8 Bar (between the inlet and outlet of the filter) in order to avoid colloid and/or MANNOSTAB®/MANNOSTAB® LIQUIDE retention by blockage and thus treatment inefficiency.

STORAGE

Must be stored in original unopened packaging in dry, chilled conditions (4°C/39.2°F - 20°C/68°F). Use within the specified use-by date. After opening, the products must be used within 24-48 hours if kept cool.

The vendor’s responsibility is limited to the supply of a product which conforms to the corresponding technical data sheet. Since the usage of the product requires, in part, a procedure which calls for treatments that are the sole responsibility of the user, the vendor cannot be held responsible for results which do not conform to the preliminary trials.