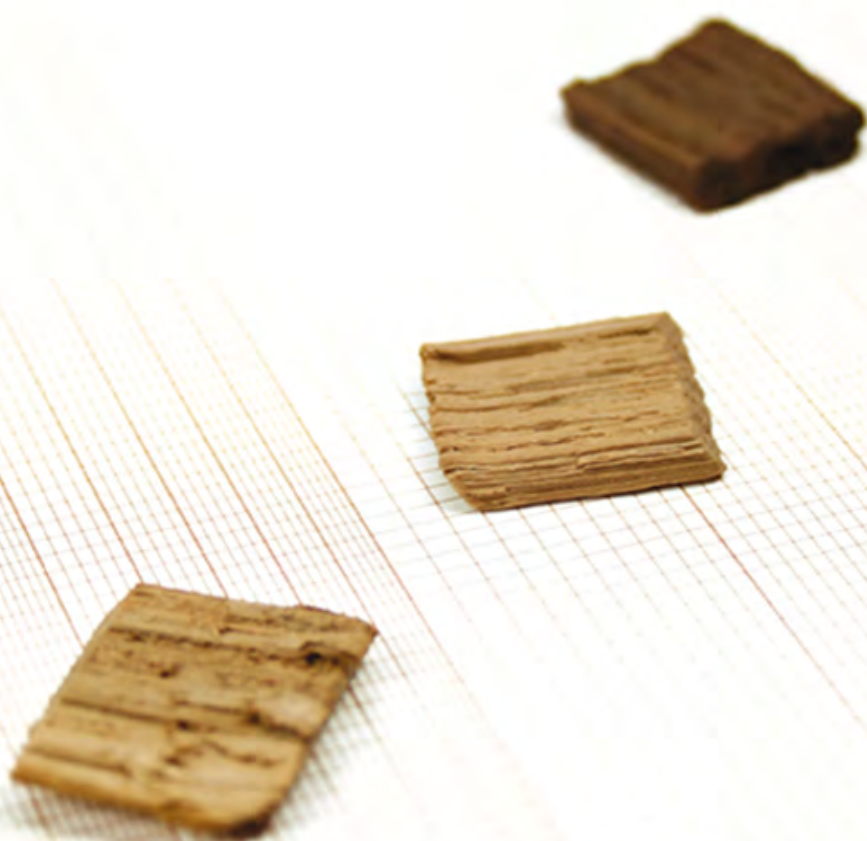


Oak chips for oenological use

TECHNICAL SPECIFICATION

2009





DESCRIPTION OF THE BOISE FRANCE RANGE OF OAK CHIPS

1. Principle

Boisé's range of oak chips was developed with the aim of providing winemaking control solutions and obtaining a defined product profile.

1.1. The product

The product was created to enable the winemaker to control the four functions of wood, while enhancing them independently of one another. These four functions are:

-  Improving the wine's structure. The wine's structure corresponds primarily to its astringency. It can be increased by the tannins in the wood.
-  Improving the sweetness. Wood in all its forms lends sweetness to the wine, which helps to lessen its astringency.
-  Intensifying the wine's colour. Wood tannins can influence the colour of red wines in particular, mainly when they are added during fermentation of the grapes.
-  Correcting the aromatic profile. This is the aspect that comes to mind first when we refer to the use of wood, even though it is no more important than the previous aspects. It concerns the expression of the wine itself, which can be intensified without the flavour of the wood being detected. It also concerns the aromas specifically introduced by the wood, such as spices, toast, almonds, vanilla, etc. A wine's aromatic complexity is enhanced by rounding off its aromatic palette.

A barrel is toasted during manufacture. It is the toasting that modifies the organoleptic characteristics of the wood. However each stave is not toasted uniformly and a toasting gradient can also be seen in the thickness of the wood. The wood of a barrel is therefore not uniform and modifies the wine simultaneously according to the four factors mentioned above. It is an advantage if this combination corresponds exactly to the profile of the wine to be put in the barrel. On the other hand, if the wine requires a different profile, the barrel shows the limits of its adaptability.

Boisé's chips have therefore been created in order to specifically introduce a precise characteristic. Consequently the range comprises a collection of products each of which has a dedicated organoleptic profile. To reproduce a barrel, all you need to do is combine different kinds of chips.

The wood used is barrel-making wood and it is subject to rigorous checks. These checks are as much visual as analytical and even taste related. The objective is to guarantee a level of quality equivalent to that of the best barrels available on the market, with a constant quality and uniformity from batch to batch.



1.2. The range

1.2.1. Bois Frais product line

- General characteristics
 - untoasted wood presenting strong potential for increasing the body in the mouth, with a low level of woody aromas;
 - the selection of raw material batches is crucial and decisive for the quality of the product;
- Specific features
 - Bois Frais: enhancement of the finish and fruity sensation
 - Bois Frais pumpable: high tannin content.

1.2.2. Single Chauffe product line

- General characteristics
 - toasted wood presenting strong potential for increasing the body in the mouth, providing complex and blended woody aromas;
 - the selection of raw material batches is crucial and decisive for the quality of the product;
 - the time when the wood chips are added has a significant impact on the modification of the wines' structure.
- Specific features
 - Single Chauffe standard blend: enhancement of the aromatic complexity and structure of the wines;
 - Fraîcheur: positive impact on the aromatic freshness of white wines.

1.2.3. Double Chauffe product line

- General characteristics
 - toasted wood presenting strong potential for increasing the level of sweetness in the mouth;
 - the control of production processes is crucial and decisive for the quality of the product;
 - the time when the wood chips are added has a significant impact on the aromatic contribution.
- Specific features
 - Double Chauffe assortie: aromatic complexity and sweetness;
 - Double Chauffe 180: adds sweetness and a vanilla flavour without aggressiveness;
 - Double Chauffe 190: adds flavours of vanilla and caramel;
 - Double Chauffe 210: adds toasted and smoked flavours and liquorice freshness;
 - Double Chauffe 310: adds grilled and coffee flavours, very strong intensity and long finish.



Some chips toasted at different temperatures. Scale 1:1

2. Production

2.1. Selection and maturing of wood used as the raw material

2.1.1. Supply

The supply is restricted to wooden boards resulting from the splitting of oak for barrel staves. These boards are “stave offcuts” and are usually considered to be by-products of barrel making. In particular, they include offcuts from thinning out and trimming. The wood is of food grade quality and certified as exempt from traces of treatment products. The organochlorine and organobromine compound concentration thresholds are fixed by the specification at:

COMPOUND	THRESHOLD
2,4,6 Trichloroanisole in µg/Kg	1.0
2,4,6 Trichlorophenol in µg/Kg	5.0
2,3,4,5 and 2,3,4,6 Tetrachlorophenols in µg/Kg	10.0
2,3,4,6 Tetrachloroanisole in µg/Kg	1.0
2,3,4,5 Tetrachloroanisole in µg/Kg	1.0
Pentachloroanisole in µg/Kg	1.0
Pentachlorophenol in µg/Kg	10.0
2,4,6 Tribromoanisole in µg/Kg	1.0
2,4,6 Tribromophenol in µg/Kg	5.0

Organochlorine and organobromine compound thresholds



2.1.1.1. Botanical origin.

Species: sessile oak (*quercus petraea* Liebl.), aged over 100 years. This species is recommended without it being obligatory, although it might seem essential. It is effectively impossible with the current state of available technology to quickly and cost-effectively check all of the trees that make up a batch. Boisé France has opted to carry out a global check of the characteristics as described below.

2.1.1.2. Geographic origin.

The wood comes exclusively from French forests.

2.1.2. Batches

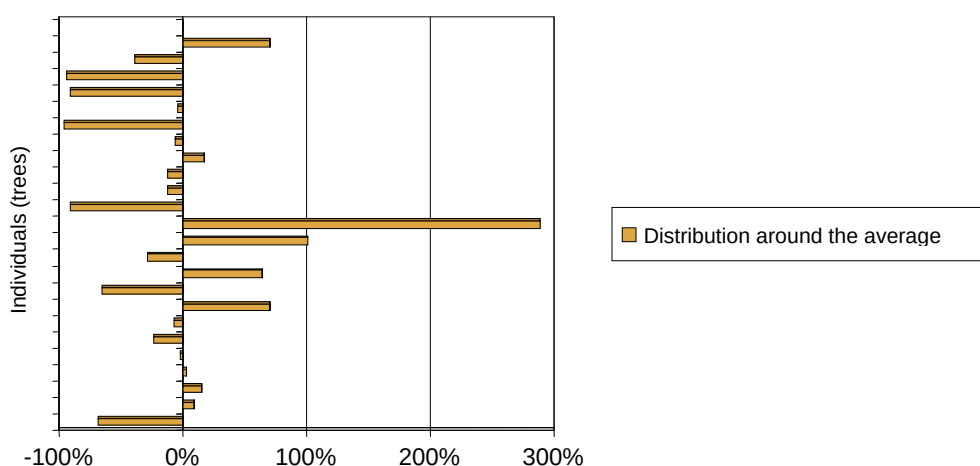
2.1.2.1. Make-up.

A batch is made up of a set of boards derived from the process of splitting wood into barrel stave logs and produced over the course of one week, amounting to 24 tonnes in total. In practical terms, one batch corresponds to one flat bed semi-trailer load.

Each batch is identified upon receipt, and sampled. The sample, which is made up of 400 kg of wood, will be analysed with a view to determining the characteristics of the batch. These characteristics will point the batches towards specific processes after maturing.

2.1.2.2. Variability of the raw material.

The variability of the composition of French oaks has been studied many times (Chatonnet, Vivas, Feuillat, Doussot, etc.). For example, Doussot (2000) studied 24 trees in the Forest of Loches:



Distribution of the total concentration of whiskey lactones around the average, for 24 trees in the Forest of Loches.

This large degree of variability is replicated in all French forests and has repercussions for the variability of the raw material used for barrel making, as well as for that of the barrels themselves.



Boisé France reduces the variability of the raw material by characterising the batches and regrouping them into batches with similar characteristics. Each group is defined depending on the characteristics expected for the finished products. Consequently, each finished product is produced using a controlled, stable raw material.

2.1.3. Storage and maturing conditions

The batches of wood (raw material) are stored in a yard, outdoors, and are subjected to natural climatic conditions. These conditions are favourable to a partial breakdown of the tannins, and to an increase in the concentration of certain aromatic compounds. The concentration of whiskey lactones thus increases as the wood matures.

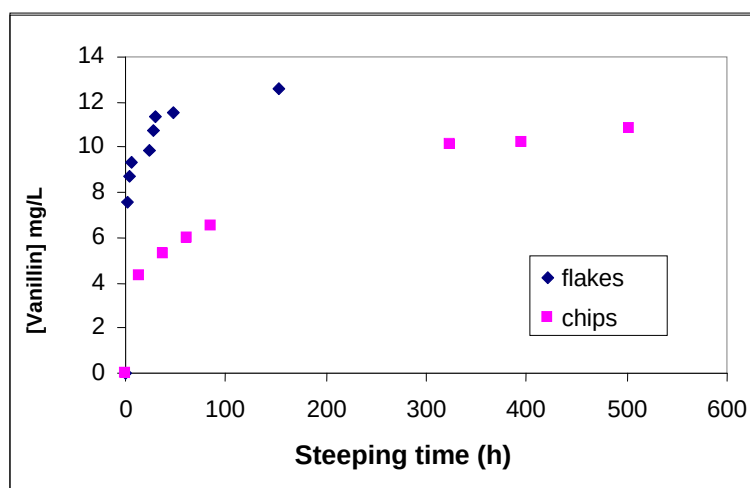
Conversely, the negative volatile compounds disappear (such as trans-2 nonenal, which has a cardboard-like aroma, or other aldehydes which have a vegetative aroma).

Boisé France matures its wood for 2 years, enabling the production of chips without any vegetative characteristics, but which at the same time intensifies the fruity hints of the wines.

2.2. Cutting and calibration

After maturing, the boards are cut using a rotary cutter, producing chips which will then be calibrated. The final size is between 7 and 20 mm, the thickness being more constant, at around 5 mm.

The size of the chips has an impact on the speed of diffusion of the extractible compounds, as can be seen from the following graph. This should be taken into account during use.



Comparison of the speed of diffusion between flakes (2 to 5 mm) and chips (7 to 20 mm)

On the other hand, the size or shape of the chips does not have an effect on their quality. The toasting cycles must be appropriate and the granulometry should be uniform.

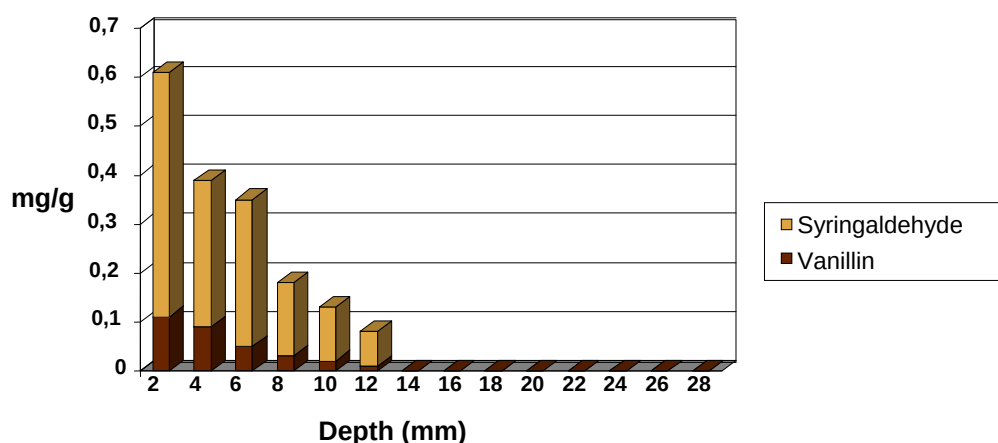
The granulometry of Boisé's chips varies little in terms of thickness, an important criterion for the regularity and uniformity of toasting.



2.3. Toasting

Toasting is carried out in convection rotary kilns, which enables a gentle and extremely uniform toasting. The temperatures can be adjusted, as well as the duration of the toasting stages.

The roasted chips undergo an initial drying phase, whose duration varies depending on the relative humidity of the wood. After this, roasting in its strictest sense begins, and the toasting stages are then fixed for better regularity and reproducibility.



Toasting gradient in the thickness of a stave, illustrated by the concentration of aromatic aldehydes.

The graph above shows the toasting gradient of a barrel stave. The outer part of the stave, which is in contact with the flame, is toasted more strongly. The control of the toasting temperature is an essential prerequisite for good reproducibility of the organoleptic characteristics of the wood. Boisé France checks each toasting temperature for precise characteristics.

2.4. Combinations

The graph above also shows the variability of the composition of the wood used for the barrels. This variability results in a recognised aromatic complexity.

Boisé France develops chips with specific, precise characteristics, which, taken separately, are more intense and have specific aromas.

One function of combining the chips is that of homogenising the batches. Apart from a selection of the batches and a regrouping by analytical profile, the combinations enable the variability within a group to be smoothed out.

To reproduce the complexity of the barrel, all you need to do is combine different kinds of chips. With 9 products in the Boisé range, the combinations are unlimited. Boisé therefore offers customised consultations to enable the correct combination to be determined to suit the user's objectives.

Controlling the combinations enables Boisé France to offer controlled, fixed quality products.



2.5. Packaging

The chips are double-packed. The primary packaging is made up of a polyester food grade mesh bag, intended to facilitate the soaking of the chips; it acts a little like a tea bag. The packaging unit is a 10 kg bag.

The secondary packaging is made up of a thermosealed polyethelene bag, also suitable for use with food. Its role is to protect the wood during storage and transport, and to limit the risk of contamination.



2 bags of Boisé France chips.

2.6. Check analyses

The check analyses are carried out on 3 levels:

On the raw material, after sampling the boards. A visual, analytical and/or taste check is carried out to confirm the batch's conformity and to direct it towards the process that is best suited to its characteristics.

After crushing, an analytical check is carried out to confirm the absence of organochlorine and organobromine compounds. This analysis confirms the supply specification criteria and also confirms that there has been no contamination during storage.

Before packaging, a third and final analysis is carried out in order to guarantee the conformity of the finished product.

Boisé France guarantees - by means of all of its manufacturing processes – the production of a top-of-the-range finished product with a constant and controlled quality, with characteristics that comply exactly with the expectations of the user.

Fine-tune your wine with precision

The enologists, biochemists and engineers at Boisé France created calibrated French oak chips to give a more precise way to integrate oak and wine. Starting with stave-quality wood, air-dried for two years, Boisé chips are analyzed, mixed for batch uniformity, and precision-toasted with convection heat. The result is eight specific aroma, flavor and textural profiles for crafting any wine with reliable repeatability.



Type BF

BOIS FRAIS (UNTOASTED)

Enhanced fruit and volume
on the palate



Type DC 180

DOUBLE CHAUFFE 180 DC180

Vanilla notes and
roundness on the palate



Type FR

FRAÎCHEUR

Freshness of fruit
expression and complexity



Type DC 190

DOUBLE CHAUFFE 190 DC190

Roundness, caramel
and toasted notes



Type DCA

DOUBLE CHAUFFE ASSORTIE

Complexity, roundness on
the palate and toasted notes



Type DC 210

DOUBLE CHAUFFE 210 DC210

Roundness, toasted
and smoky notes



Type SCA

SINGLE CHAUFFE ASSORTIE

Complexity, structure
and volume on the palate



Type DC 310

DOUBLE CHAUFFE 310 DC310

Coffee notes and
roundness on the palate

Specifications

Boisé French oak chips are made from sessile oak (*Quercus Petrae*), and range in size from 5-20mm.

Untoasted chips are also available in a smaller, pumpable size.

Toasted oak chips fully integrate with wine in 8 weeks.

Chips are warehoused in Northern California, shipped within 48 hours of order confirmation, and come in pre-filled 10 kg (22 lb) mesh bags, ready to use.

Bags are protected for shipping by air-tight plastic outer bags.



Untoasted wood chip

BOIS FRAIS

French untoasted oak chips BF

Why ?

**Fruit and volume
on the palate**

Presentation

Bois Frais is untoasted wood. It therefore conserves all the characteristics of its botanical and geographical origin and of its seasoning. The various steps in batch selection are determining factors in the production process, and ensure that quality is both homogeneous and of an excellent standard.

Effect on wine colour

At the same time, Bois Frais has a positive influence on wine colour by protecting anthocyanins. Colour intensifies if Bois Frais is used in fermentation or in the early states of ageing.

Aromatic characteristics

At Boisé France, raw materials are rigorously controlled and we select oak that particularly enhances the fruitiness of wines. Notes of coconut and citrus fruit appear, but the natural fruit flavour of the wine itself is also more intense. Bois Frais does not impart woody aromas to wine.

Effect on the palate

The natural wood polysaccharides impart both softness and structure. Mouthfeel is enhanced in both red and white wines as Bois Frais intensifies both roundness and structure.

Applications in oenology

Enhanced fruitiness.
Deeper colour.

Increased volume and structure.
Greater softness.

How much to add and when

Depending on the objectives:
- During alcoholic fermentation.
- Between alcoholic and malolactic fermentations.

Recommended contact time:
2 months minimum. Depending on the characteristics of the juice or wine, doses vary from 0.5 to 10 g/l

Untoasted oak chips for œnological use

Finely calibrated and sorted, the BOIS FRAIS pumpable untoasted oak chips in the Boisé range allow you to tailor the profile of your wine right from the start of fermentation.



Bois Frais pumpable chips

BOIS FRAIS PUMPABLE

Why?

Structure, fruitiness and volume

Used on high quality grapes, bois frais increases aromatic intensity and volume on the palate.

On lower quality grapes, fruitiness is intensified through the reduction of vegetative character and the color is stabilized.

An innovative product from Boisé France, Bois Frais is effective because of a rigorous selection of oak based on specific biochemical criteria. Used on either white or red grapes, the chips have an extremely rapid effect, from a few hours to a few days.

Applications in œnology

Enhanced fruitiness
Stabilization of the colour

Increased volume on the palate
Inhibition of laccase activity on botrytised grapes

When to use and dosage

On black grapes:
During tank filling or on the liquid phase in thermovinification
On white grapes:
During fermentation in liquid phase

Dosage:
- 3-4 g/L



Mildly toasted wood chip

FRAÎCHEUR

Why ?

Complexity and aromatic freshness

Presentation

The Fraîcheur blend is a mixture of wood chips toasted to different degrees, specifically developed for white wines. Rigorous selection of raw materials in addition to strict control of toasting cycles are key elements in creating unequalled aromatic freshness.

Effect on wine colour

The Fraîcheur blend has little impact on the colour of white wines.

Effect on the palate

Used in fermentation, the Fraîcheur blend increases the perception of sweetness in white wines. In ageing, overall mouthfeel is amplified.

Aromatic characteristics

If the expression of fruitiness still dominates, it is intensified by fresh, menthol notes which enhance the aromatic freshness of white wines, while retaining characteristic thiol-based “sauvignon-type” aromas.

Applications in oenology

Enhanced aromatic freshness in white wines.

Intensification and enhancement of the actions of gum arabic.

How much to add and when

According to the objective:
- During alcoholic fermentation.
- Occasionally during ageing.

Recommended contact time:
2 months minimum. Depending on the characteristics of the juice or wine, doses vary from 2 to 10 g/l.



Medium toasted oak chip

SINGLE CHAUFFE ASSORTIE - SCA

Why ?

Complexity and volume on the palate

Presentation

Single Chauffe Assortie – SCA is a range of toasted oak chips. Chips that have been subjected to different levels of toasting are blended, which is what gives Single Chauffe Assortie – SCA its unique special complexity.

Effect on colour

Single Chauffe Assortie – SCA has a particularly beneficial effect on wine colour by enhancing the stability of anthocyanins. If used in fermentation or in the early stages of ageing, the wine's colour becomes markedly richer and more intense.

Role in mouthfeel structure

Single Chauffe Assortie – SCA above all increases the wine's structure on the palate. Furthermore, mouthfeel volume is increased in both red and white wines.

Aromatic characteristics

If fruity attributes predominate, they are enhanced by the aromas imparted by the complex aromas resulting from toasting.

Applications in oenology

Increased structure and volume on the palate in red wines.

Increased complexity of the aromatic range.

How much to add and when

Depending on the objectives:

- During alcoholic fermentation.
- Between alcoholic and malolactic fermentations.
- Occasionally during ageing.

Recommended contact time:

2 months minimum. Depending on the characteristics of the juice or wine, doses vary from 0.5 to 15 g/l.



High toast oak chip

DOUBLE CHAUFFE ASSORTIE - DCA

Why ?

Roundness and sweetness

Presentation

Double Chauffe Assortie – DCA is a range of toasted oak chips. Chips that have been subjected to different levels of toasting are blended, which is what gives Mixed Double Chauffe its unique particular complexity. Tannins are eliminated by a physical process which retains all the aromatic attributes which toasting imparts.

Effect on roundness

The natural wood polysaccharides are less marked than in “Bois Frais” (untoasted wood), nonetheless they contribute to enhancing the softness and overall harmony of the wine. Double Chauffe Assortie – DCA particularly enhances the roundness of the wine.

Effect on mouthfeel structure

Since the tannins are removed, the tannic structure of the wine remains relatively unchanged. This makes Double Chauffe Assortie – DCA a particularly attractive product for well structured red wines or for ageing of white wines.

Aromatic characteristics

If fruity attributes predominate, they are enhanced by the complex toast aromas which vary from spice to roasted dry fruit and vanilla.

Applications in oenology

Increased roundness and volume on the palate.

Increased complexity and aromatic range.

How much to add and when

Depending on the objectives:

- During alcoholic fermentation.
- Between alcoholic and malolactic fermentations.
- Occasionally during ageing.

Recommended contact time:

2 months minimum. Depending on the characteristics of the juice or wine, doses vary from 0.5 to 5 g/l.



High toast oak chip

DOUBLE CHAUFFE 180 - DC180

Why ?

Roundness and vanilla notes

Presentation

Double Chauffe is a range of toasted oak chips. Tannins are eliminated using a physical process which retains the aromatic attributes imparted by toasting. Double Chauffe 180 is toasted to a single temperature ensuring a greater degree of precision.

Effect on roundness

The natural wood polysaccharides are less marked than in “Bois Frais” (Untoasted wood), nonetheless they contribute to enhancing the softness and overall harmony of the wine. In the Boisé France range, Double Chauffe 180 is the chip that imparts the greatest roundness, accentuated by vanilla notes.

Aromatic characteristics

The aromas imparted by toasting are mainly centered on notes of vanilla and brioche.

Effect on mouthfeel structure

Since the tannins are removed, the tannic structure of the wine remains relatively unchanged. This makes Double Chauffe 180 a particularly attractive product for well structured red wines or for the ageing of white wines.

Applications in oenology

Greater softness and roundness.

Modification of aromatic attributes towards vanilla and brioche.

How much to add and when

Depending on the objectives:
- Between alcoholic and malolactic fermentations.
- In ageing.

Recommended contact time:
2 months minimum. Depending on the characteristics of the juice or wine, doses vary from 0.5 to 5 g/l.



High toast oak chip

DOUBLE CHAUFFE 190 - DC190

Why ?

Toast and caramel notes

Presentation

Double Chauffe is a range of toasted oak chips. Tannins are eliminated using a physical process which retains the aromatic attributes imparted by toasting. Double Chauffe 190 is toasted at a single temperature ensuring a greater degree of precision.

Role in mouthfeel structure

Since the tannins are removed, the tannic structure of the wine remains relatively unchanged. This makes Double Chauffe 190 a particularly attractive product for well-structured red wines or for the ageing of white wines.

Effect on roundness

The natural wood polysaccharides are less marked than in "Bois Frais" (untoasted wood), nonetheless they contribute to enhancing the softness and overall harmony of the wine.

In the Boisé France range, Double Chauffe 190 is the chip that imparts the greatest roundness, accentuated by caramel notes.

Aromatic characteristics

The aromas imparted by toasting are mainly centred on toasted and caramel flavours.

Applications in oenology

Greater softness and roundness.

Modification of aromatic attributes towards toast and caramel.

How much to add and when

Depending on the objectives:
- Between alcoholic and malolactic fermentations.
- In ageing.

Recommended contact time:
2 months minimum. Depending on the characteristics of the juice or wine, doses vary from 0.5 to 5 g/l.



High toast oak chip

DOUBLE CHAUFFE 210 - DC210

Why ?

Toasted and smoky notes

Presentation

Double Chauffe is a range of toasted oak chips. Tannins are eliminated using a physical process which retains the aromatic attributes imparted by toasting. Double Chauffe 210 is toasted at a single temperature ensuring a greater degree of precision.

Role in mouthfeel structure

Because the tannins are removed, the tannic structure of the wine remains relatively unchanged. This makes Double Chauffe 210 a particularly attractive product for well structured red wines or for ageing of white wines.

Effect on colour

Toasting dramatically alters wood compounds. As a result, coloured compounds that appear during toasting contribute to enhancing the wine's colour.

Aromatic characteristics

The aromas imparted by toasting are mainly centred on toasted and smoky flavours.

Applications in oenology

Greater softness and roundness.

Modification of aromatic attributes towards toasted and smoky aromas.

How much to add and when

Depending on the objectives:
- Between alcoholic and malolactic fermentations.
- In ageing.

Recommended contact time:
2 months minimum. Depending on the characteristics of the juice or wine, doses vary from 0.5 to 5 g/l.



High toast oak chip

DOUBLE CHAUFFE 310 - DC310

Why ?

Toasted and smoky notes

Presentation

Double Chauffe is a range of toasted oak chips. Tannins are eliminated using a physical process which retains the aromatic attributes imparted by toasting. Double Chauffe 310 is toasted at a single temperature ensuring a greater degree of precision.

Role in mouthfeel structure

The natural sweet wood compounds are less abundant than in “Bois frais” (untoasted wood), but they contribute nonetheless to enhancing the softness and overall harmony of the wine.

Since the tannins are removed, the tannic structure of the wine remains relatively unchanged. Double Chauffe 310 imparts softness in particular.

Effect on colour

Toasting dramatically alters wood compounds. As a result, coloured compounds that appear during toasting contribute to enhancing the wine's colour.

Aromatic characteristics

Aromas imparted by toasting are mainly centred on toasted and coffee flavours that are deliciously long on the palate, much more intense than DC210.

Applications in oenology

Greater softness and roundness.

Modification of aromatic attributes towards toasted and coffee aromas.

How much to add and when

Depending on the objectives:
- Between alcoholic and malolactic fermentations.
- In ageing.

Recommended contact time:
2 months minimum. Depending on the characteristics of the wine, doses vary from 0.5 to 2 g/l.