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MARIAUD CONSULTING

BARREL SCRIBING

Our PROGRAM

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Barrel scribing

01 Introduction

Scribing, also called **barrel layout establishment**, is a **fundamental** step in barrel manufacturing.
Yet, it is often one of the least explained stages.

It is at this precise stage that **the decisions** are made which will determine:

- **the watertightness** of the barrel,
- its **mechanical strength** over time,
- its **visual appearance**,
- and a large part of the defects or rework in the workshop.
- Scribing is not an automatic operation.

It is a way of **reading the wood**, **distributing stresses**, and **anticipating the future** behavior of the barrel.

In this course, we will cover:

- what barrel scribing really is,
- how to select and orient the staves,
- where to position defects, and most importantly why,
- and which mistakes to avoid in order not to weaken the barrel from the very beginning.

The objective is simple:
To give you a clear, repeatable, and logical method, usable both in the workshop and in production management.

One thing to remember from now on:
a barrel is determined on the scribing table, not during assembling.

02 Definition of barrel scribing

Definition of scribing / barrel layout establishment

Scribing, also called **barrel layout establishment**, is the operation consisting of laying out all the staves side by side on a table before assembling, in order to build the **complete barrel development**.

But scribing is not limited to simply aligning staves.

It is a stage of wood selection, orientation, and distribution, allowing the cooper to:

- choose the staves suited to the barrel being manufactured,
- orient each stave according to its defects and quality,
- distribute the mechanical stresses across the entire barrel,
- anticipate the watertightness, strength, and visual appearance of the barrel.

During scribing, the cooper decides:

- which staves will be used,
- where they will be positioned on the barrel,
- how their defects will be distributed.

03 Prerequisites before scribing

Prerequisites before scribing

Before starting the scribing process, it is essential to verify that the traceability sheet **has been properly completed**.
The level of traceability may vary from one company to another, but certain information is non-negotiable for proper scribing.

1. Verify that all information is present

The sheet must be:

- available,
- readable,
- completed before the start of scribing.

2. Essential information for scribing

To carry out proper scribing, the following information is required at minimum:

The barrel type

- New barrel, repair barrel set, specific barrel

The wood origin

- Sessile oak, pedunculate oak, acacia, chestnut
- French oak: Tronçais, Bertanges, Limousin...
- American oak: Pennsylvania, Missouri...

The production order (Production Order / O.F.)

The final use

- Wine
- Spirits
- Ratafia
- etc...

These elements directly influence:

- stave selection,
- defect tolerance,
- the required mechanical and visual quality standards.

Prerequisites before scribing

3.Toasting on the traceability sheet

Toasting does **not directly influence stave** selection during scribing.
It is therefore not a wood selection criterion at this stage.

However, it must absolutely be **known and clearly** indicated for another reason:
the transmission of information to the following workstation stages.

4.Customer specifications and requirements

This is a point that is often underestimated, but essential.
It is necessary to verify whether there are:

- customer specifications,
- specific requests.

For example:

- a specific bung diameter,
- a specific toast level,
- a different hoop color,
- specific branding or identification marks.

These elements must be anticipated from **the scribing stage** in order to:

- mark them on the barrel,
- make them visible for the following production stages,
- avoid mistakes or omissions during production.

03 Prerequisites before scribing

Moisture control of wood batches

In addition to the traceability sheet, it is strongly recommended to check the moisture content of each wood batch before or during scribing.

This check is not intended to immediately reject a batch, but to document the condition of the wood.

For each wood batch:

- take one measurement on a stave:
  - at the top of the stack,
  - in the middle of the stack,
  - at the bottom of the stack,
- record the values,
- note the average moisture content of the batch in the measuring device or tracking system.

What is the purpose of this moisture recording?

In the event of problems such as:

- stave breakage,
- abnormal behavior in the cellar,
- flavor defects,
- or quality drift,

it allows you to:

- quickly check the condition of the wood,
- rule out or identify a drying issue,
- detect wood that is too dry or too wet.

The main objective: avoiding false causes

Without this moisture recording, there is a tendency to:

- question a method,
- modify a machine setting,
- change a working process,

when the problem may simply come from the wood moisture content.

04 Prerequisites before scribing

The quality of scribing directly depends on **the preparation of the workstation.**

A poorly organized workstation leads to selection mistakes, omissions, and loss of time.

1. Table adjustment and dimensions

Before starting:

- the scribing table must be adjusted to the **correct development** of the barrel being manufactured,
- its dimensions must correspond to the barrel circumference plus an additional allowance for tightening during toasting.

2. Organization of wood pallets

The pallets must be:

- clearly identified (origin, batch, intended use),
- positioned close to the scribing table,
- accessible without unnecessary movement or crossing paths.

3. Definition of sorting areas

The workstation must include clearly defined areas for:

- compliant staves for scribing,
- staves with acceptable defects,
- staves with unacceptable defects.

4. Tools and marking

Before scribing, the following must be available:

- marking tools (chalk, pencil, marker),
- reference marks to identify the clean side,
- means of recording traceability information on the barrel.

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05 Stave selection and inspection

Operator method – step by step

Step 1 — Verify that you are working with the correct batch

Before handling a stave:

- confirm **the batch / pallet** (wood origin, Production Order / O.F., production number),
- verify that you are **not mixing** it with another batch and that it matches the order requirements,
- position the pallet **in the correct place** (next to the table, with easy access).

05 Stave selection and inspection

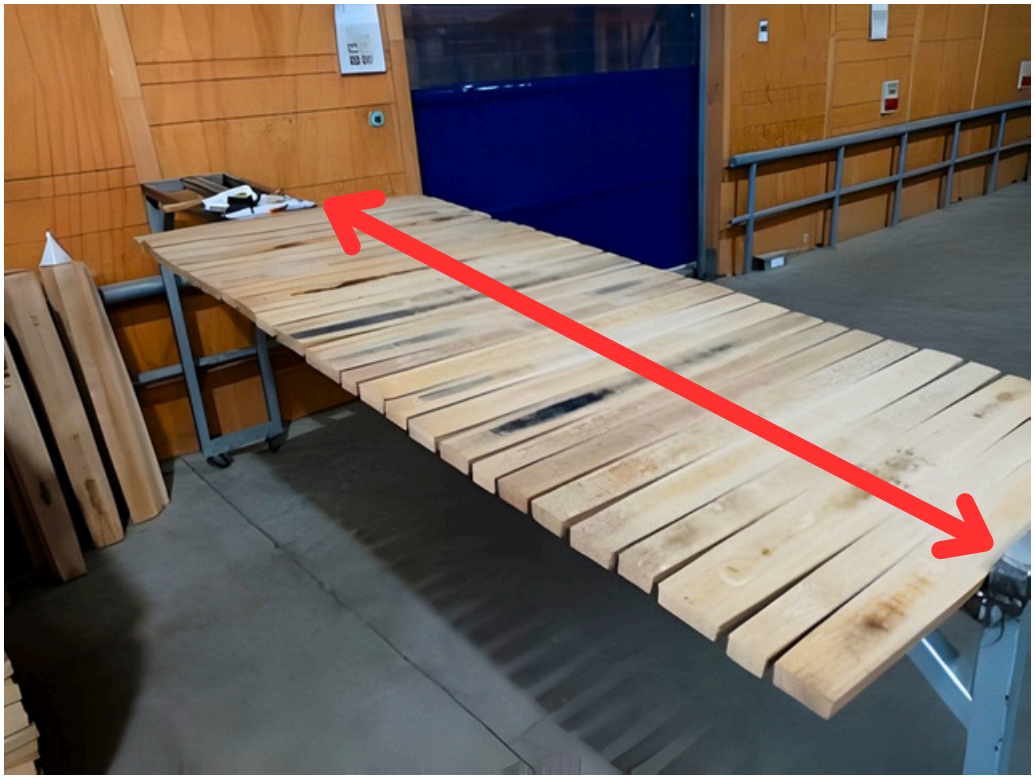
Operator method – step by step

Step 2 — Check the scribing table

- Before taking the first stave, the table must be validated.

To be checked:

- **the table dimensions correctly** match the required barrel development for the ordered product,
- the adjustment is suitable for **the type of barrel** being manufactured, for example adjusting the stops at the bilge according to the stave length,
- the table is stable, clean, and clear of obstruction.



It is essential to refer to **the company's internal documents** in order to know the correct dimensions and settings according to the type of barrel being manufactured.

05 Stave selection and inspection

Operator method – step by step

Step 3 — Take a stave and perform a “6-face” inspection

Each stave must always be inspected in the same order to avoid missing anything.

Simple method:

- Outside face
- Inside face
- Edge 1
- Edge 2
- End 1
- End 2

Step 4 — Classify the defect: acceptable or unacceptable

As soon as you identify a defect, classify it immediately.

- **Acceptable defect** = visual impact (acceptable according to internal standards)
  - The stave remains usable, but its placement must be controlled.
- **Unacceptable defec**t = risk to watertightness / filtration / structural strength
  - The stave is removed from barrel production or reprocessed for another use.

Immediate action:

- **Acceptable** → “acceptable” zone/pallet
- **Unacceptable** → “unacceptable” zone/pallet

It is recommended to organize the scribing table with **separate compartments in order** to immediately sort the staves by **defect type**. By **grouping minor defects on the same barrel**, rework can be limited to a single barrel **instead of requiring intervention on several barrels.**

05 Stave selection and inspection

Operator method – step by step

In the upper area of the barrel, **where mechanical stresses and pressure are lower**, it is possible to position defects presenting a slight leakage risk, **such as slightly cut wood fibers**, provided they are controlled and correctly oriented.

Area

×

Defects

On the heads, **all visual defects** should preferably be positioned on the rear head and **rear bevel**.

Defects presenting a potential watertightness weakness, such as a pronounced grain line or cut wood fibers, must be oriented in a way that **limits the risk of leakage** by placing them in areas where pressure is lowest.

All visual defects that do not cause

any risk to the barrel structure or its watertightness,

such as sound knots, may be positioned on the lower section or on the rear of the barrel.

05 Stave selection and inspection

Operator method – step by step

This diagram uses **a color code to indicate where the different types of defects should be positioned** on the barrel.
During scribing, it is essential **to create reference points** on the table so that, during assembling, **the staves are positioned exactly where intended on the barrel.**

These reference points **make it possible to anticipate the final position of the defects** and **prevent a controlled defect from ending up in an unsuitable area.**

Installing a **stop on the scribing table** makes it possible to always start from the same barrel development **reference point**, generally at the center, regardless of the barrel format being manufactured.

This stop also serves as a visual reference for scribing: **the side of the stop corresponds to the side where defects are positioned.**

By defining this reference directly on the table, it ensures that once the barrel is assembled, **these defects will be positioned on the lower part of the barrel.**

This area is intentionally chosen because it is **the most exposed to impacts** and c**orner damage during barrel handling and movement before bending.**

05 Stave selection and inspection

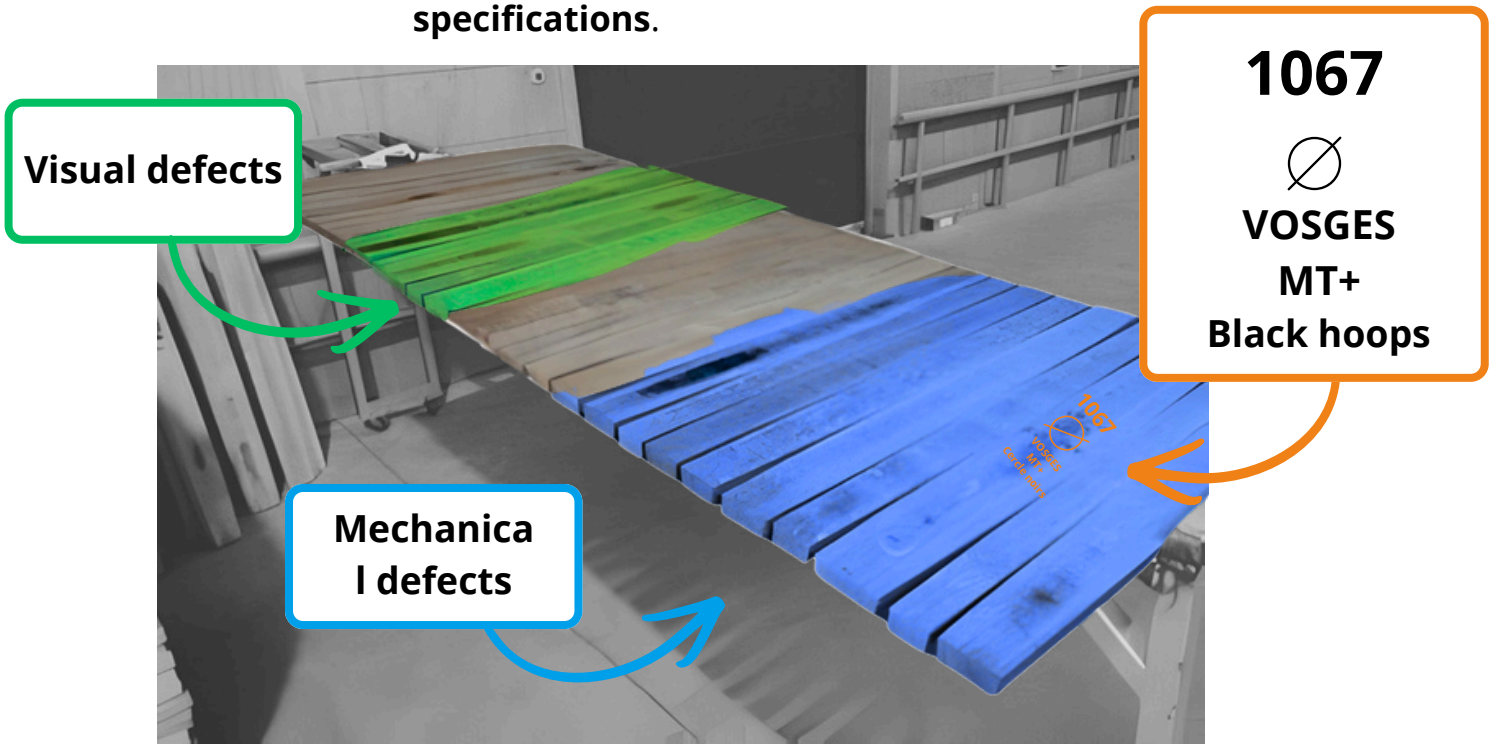
Operator method – step by step

Before anything else, it is essential to identify the bung stave.
This stave must be:

- **identified as the bung stave,**
- clearly marked.

The following essential information is also recorded on this stave:

- **the barrel number,**
- **the wood origin,**
- **the planned toast level,**
- **the customer name,**
- or **any specific requirement related to the customer specifications**.



Once the bung stave has been identified and marked, the next step is simply **to classify the defects by category.**

Each stave is positioned on the table according **to the type of defect it presents**, using **the areas or reference points previously defined** on the scribing table.

05 Stave selection and inspection

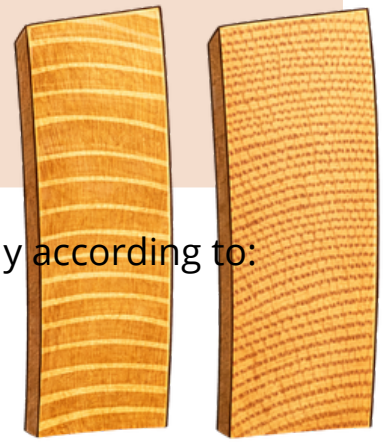
Operator method – step by step

Grain sorting according to specifications

Depending on the customer specifications or the company's internal recipes, it may be necessary to sort the wood according to its grain.

It is therefore essential to be able to distinguish between:

- **coarse grain,**
- **medium grain,**
- **fine grain.**



This sorting makes it possible to build a consistent assembly according to:

- **the desired aromatic profile,**
- **the type of product (wine, spirits, beer),**
- **the specifications sold by the sales department.**

Alternating stave widths for a uniform shape

When building the barrel development, it is essential to alternate stave widths evenly.

A typical sequence may be:
small, medium, large, medium, small.

The objective is to achieve a **uniform distribution** of stave widths across the entire barrel.

If all wide staves are grouped on one side and all narrow staves on the other, the barrel will tend to:

- **become flatter in the area of the wide staves,**
- **and more rounded in the area of the narrow staves.**

05

Stave selection and inspection

Conclusion – Scribing protocol

This scribing protocol can be **adapted to any workshop**, provided a simple and rigorous logic is followed.

1.Verify wood compliance
Ensure that the wood origin, timber, batches, and specifications correctly match the order requirements.

2.Check the scribing table
Verify that the table dimensions exactly match the type of barrel being manufactured.
An incorrectly adjusted table compromises the entire process.

3.Define a Side A and a Side

- **Side A**: clean side (visible aesthetic side).
- **Side B**: side where acceptable defects will be oriented.

In practice, this reference generally corresponds to the side positioned against the head stop.
It can be marked with a line at the stave head.

4.Identify the bung stave
Clearly identify it and record the necessary information:

- **barrel number,**
- **wood origin,**
- **toast level,**
- **customer name or specific requirements.**

5.Distribute defects according to the barrel zones
Position visual and mechanical defects according to the stress zones of the barrel in order to anticipate their final position after assembling.

6.Sort and organize defects
Remove unacceptable defects and organize the remaining ones into dedicated compartments or storage areas using a clear and repeatable method.

06 Construction of the barrel development

Calculation and inspection of barrel development

1.Basic principle: starting from the target bilge diameter

To calculate a barrel development, you always start from the target bilge diameter.

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Development = Diameter × π

Therefore::

Theoretical development = D × 3.1416

This gives the **theoretical circumference** of the barrel at the bilge.

2. Adding the allowance (workshop margin)

In practice, the calculation does not stop at the theoretical development.
Traditionally, coopers generally added 1 mm per stave.
With 25 to 30 staves, this represents approximately:

+20 mm to +30 mm of allowance.

Why?

Because from assembling to toasting, there is:

- **compression of the stave edges,**
- **tightening pressure,**
- **wood adaptation.**

⚠️ This allowance depends on:

- **the manufacturing process,**
- **the type of hooping,**
- **the tightening pressure,**
- **the level of compression observed in the workshop.**

👉 It must therefore be adjusted according to your actual process.

06 Construction of the barrel development

Calculation and inspection of barrel development

3.Production development: inspection at the bilge

In production, the inspection is mainly carried out at the bilge, as this is the reference area.

Applied formula:

Bilge development = (Bilge diameter × π) + allowance

This value becomes the reference setting for the scribing table.

4. Inspection of a new model: checking both heads

Method:

1. **Determine the barrel dimensions,**
2. **Calculate the required development at the bilge and at the heads,**
3. **Lay out the staves until the required bilge development is achieved,**
4. **Gather all staves side by side at one end,**
5. **Check the total dimension,**
6. **Repeat the same operation on the other end.**

✓ **1 – Symmetry of both ends**
Both developments must be identical.

✓ **2 – Consistency of the bilge / head ratio**
It is necessary to verify that the ratio between:

- bilge development,
- head development,

corresponds to the ratio between:

- bilge diameter,
- head diameter.

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Wood is a noble material because it comes from a long natural cycle. It is up to us to respect it.

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