Our diversity, your singularity

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V&T AMPHORES

We place our expertise — built on over 12 years of experience and scientific studies—at the service of passionate winemakers, brewers, and distillers.

By exploring the world to discover artisans with ancestral know-how and exceptional materials, we offer vessels made from

terracotta, stoneware, technical ceramic, and granite,

designed to help you create unique, more natural beverages that reflect your identity.

We offer the most diversified range on the amphora market, encompassing multiple materials, volumes, and shapes.

We respond precisely to the specific needs of our clients, through careful selection and tailored adaptation of vessels.

From the composition of the jars, to the choice of shapes, and up to the origin of their manufacture, we ensure full traceability, guaranteeing transparency and quality.

As a human-sized company, we support our clients from initial consultation through post-purchase follow-up, providing bespoke expertise.

In 2024, to mark our openness to creators of all types of quality beverages,

Vin et Terre becomes V&T AMPHORES

V&T AMPHORES offers...

A range unique in its diversity, featuring
4 materials, 12 vessel types,
available in multiple volumes,
representing 25 different models
to best meet your needs.

Today, our amphorae are present :

on 5 continents
in 30 countries
with more than 1,300
winemakers, brewers,
and distillers
in France
and over 250
worldwide

Nearly
200 special cuvées
are produced
in our vessels.

Advantages of our jars

- **Diversification of micro-oxygenation rates**, depending on the material
- Preservation of fruit quality and **aromatic authenticity**
- Promotion of ionic exchanges and distinctive tactile qualities, bringing **a unique signature** to beverages
- Creation of **special cuvées**
- Production of **light, fruity, and digestible beverages**
- Contribution of **delicacy, minerality, and freshness**
- **Enhanced hygiene**
- Reduction — or even **elimination — of oenological inputs**
- Excellent **thermal insulation**
- **Greater durability** than oak barrels

Photo credits : Château Meylet

Terracotta vessels

Terracotta Impruneta Label

V&T AMPHORES has selected terracotta potters based in Impruneta, Tuscany. This small village was already producing orcio during the Middle Ages, used for the storage of olive oil and wine. Since that time, vessels have been shaped using the same traditional gestures.

This high-quality clay is unique due to its mineralogical composition, marked by the high presence of a limestone residue known locally as galestro (friable clay schist), widely recognised throughout the Tuscan Apennines.

Extremely dense and among the most workable clays in the world, this raw material makes it possible to produce durable, resistant terracotta vessels with remarkable plastic beauty.

A well-maintained jar can be used for over one hundred years.

Artisanal manufacturing

Raw clay must be kneaded by hand to ensure perfect structural integrity and eliminate any weakness such as trapped air bubbles.

In jar production, wall thickness is critical and requires a level of skill that only handcrafting can achieve properly. These terracotta jars are built using the ancestral coil-building technique (colombin).

Before firing, the shaped raw clay must undergo 7 weeks of drying, during which it loses 10 to 15% of its weight due to water evaporation. This phase is particularly sensitive to weather conditions : Excessive heat accelerates drying and may cause cracking High humidity slows drying and may lead to deformation or collapse.

Firing : The jars are fired at 1020°C, following a cycle of 48 to 60 h :

24 to 36 hours temperature increase
12 to 24 hours at peak firing temperature
48 hours cooling down

Photo credits : Atelier Artenova team, Andrea Parisi at work

Main qualities of our terracotta jars

• Respect for the grape variety •

• Preservation of fruit quality •

• Aromatic authenticity •

• Velvety, rounded tannins (for wines) •

• Excellent thermal insulation •

Each jar is entirely handmade, allowing the potter to take the necessary time to reinforce sensitive areas and to transmit intention and craftsmanship—an expertise inherited over centuries.

Natural material

This is a natural clay requiring no coating, allowing direct contact between the liquid and the vessel wall.

It is a material that promotes micro-oxygenation, rounding the beverages while allowing the fruit to fully express itself.

" These amphorae highlight the grape variety by revealing its purity, producing authentic wines without artifice. Terracotta makes it possible to obtain pure wines with freshness, softness, a hint of minerality and great length on the palate—reminiscent of wines from antiquity. "
@Le Clos d'Elpis
double gold medalist at Grenaches du Monde 2022

Photos credits : Les Cuvées Insolentes

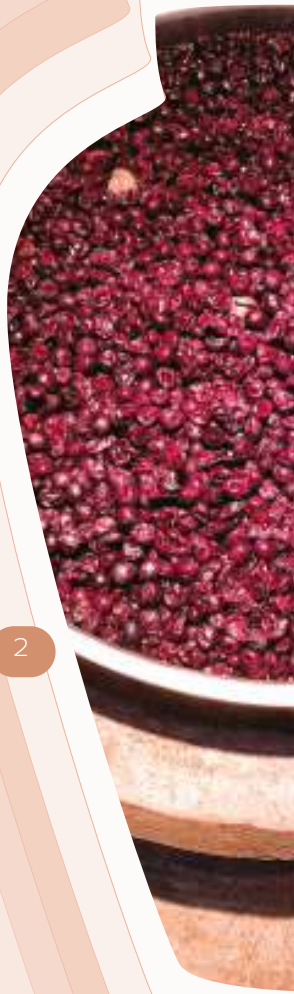
Our Terracotta Range

COMPOSITION

Si:41%-Al:17,54% - Ca:20,90% -Fe:11,83%
K:3,13%-Mg:4,56%-L.O.I.: 1,04%

Jarre

Capacity	Height	Diameter	Weight
80 L	80 cm	55 cm	80 kg
300 L	110 cm	86 cm	140 kg
500 L	122 cm	100 cm	170 kg
800 L	153 cm	118 cm	300 kg



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Dolium

Capacity	Height	Diameter	Weight
1000 L	165 cm	135 cm	320 kg

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9

Influence of shape on liquid movement

Shapes influence liquid movement.
Speed, distribution and amplitude of movement rated from 1 to 5 :

1 low → 5 high

See Wine movement study – page 30

Jar thickness : approx. 3 cm

Each piece is unique. Shapes, dimensions, volumes and colour tones may vary. Due to manufacturing complexity, some vessels may include epoxy reinforcements that do not affect wine quality. Photos non-contractual.

Egg Standing

Capacity	Height	Diameter	Weight
450 L	130 cm	95 cm	200 kg
650 L	150 cm	105 cm	250 kg

Egg Lying

Capacity	Length	Diameter	Weight
225 L	90 cm	75 cm	130 kg

With hatch and Ø 12 cm stainless steel lid

Stoneware vessels

Why stoneware

To offer producers a broader range of options, we have also chosen stoneware, which provides lower micro-oxygenation than terracotta.

Stoneware pottery is made from a silica-rich clay, fired at high temperature (1100–1300°C). At these temperatures, the clay partially vitrifies, sealing some of the pores. As a result, stoneware is denser and les s porous than terracotta, while still allowing subtle micro-oxygenation.

Sichuan stoneware unique and precious

We travelled to China, the millennia-old cradle of stoneware and porcelain ceramics. These materials have been continuously used there, notably for the storage of rice wines and spirits. Committed to preserving traditional expertise in food-grade vessel manufacturing, we draw directly from this intangible heritage.

Certain traditional shapes have been adapted to meet the needs of modern beverage producers, while others have been newly designed. Their production is ensured by Yunqiao, expert Chinese ceramicist and long-standing partner of V&T AMPHORES. The workshops are located near the extraction quarries, in the Sichuan Valley, China.

Artisanal manufacturing

Stoneware can be produced from red, brown, white, grey, or black clay, depending on composition and oxide content. The clay is kneaded with spring water, then filtered to obtain a very fine-grain clay body.

The vessels are formed by assembling multiple levels of raw clay using moulds. While this process ensures regularity of shape, each level is assembled entirely by hand, allowing potters to reinforce areas where needed.

Photo Credits : Yunqiao Workshop, China,V&T Amphores

Main qualities of our stoneware jars

• Respect for the grape variety •
• Aromatic authenticity •
• Preservation of fruit quality •
• Gentle, controlled micro-oxygenation •
• Excellent thermal insulation •
• Delicacy, lightness, minerality, freshness •

Natural and reliable

Like terracotta, stoneware is a natural clay that requires no coating, allowing direct contact between the liquid and the vessel wall.

Healthy

Thanks to the crystalline structure of stoneware, our jars exhibit a high ionisation capacity.

Resistant and insulating

These vessels are characterised by very high hardness and excellent resistance to chemical and thermal stress.

Practical

The smooth walls of stoneware jars make cleaning easier.

Our Stoneware Range

COMPOSITION

SiO2 : 62,56% - Al2O3 : 18,29% - Fe2O3 : 7,09%
TI02 : 0,02% - CaO : 0,28% MgO : 0,80% - K2O : 2,22% -
Na2O : 0,11% - L.O.I. : 6,46%

Zen

Capacity	Height	Diameter	Weight
80 L	83 cm	46 cm	80 kg
500 L	148 cm	90 cm	200 kg
1000 L	175 cm	110 cm	290 kg
1200 L	192 cm	113 cm	335 kg

Satine

Capacity	Height	Diameter	Weight
200 L	100 cm	80 cm	90 kg
700 L	155 cm	98 cm	220 kg

Coralie

Capacity	Height	Diameter	Weight
320 L	115 cm	90 cm	130 kg
500 L	132 cm	106 cm	200 kg
1000 L	150 cm	127 cm	250 kg

1

2

3

Influence of shape on liquid movement

Shapes influence liquid movement.
Speed, distribution and amplitude of movement rated from 1 to 5 :

1 low ····▸ 5 high

See Wine movement study – page 30

Jar thickness : approx. 3 cm
Each piece is unique.
Shapes, dimensions, volumes and colour tones may vary.
Photos non-contractual.

3

Ovo Standing

Capacity	Height	Diameter	Weight
500 L	140 cm	95 cm	200 kg
1000 L	175 cm	130cm	350 kg

5

Ovo Lying

Capacity	Diameter	Length	Weight
300 L	85 cm	115 cm	110 kg

Bung hole Ø 5 cm

5

Divine

Capacity	Height	Diameter	Length	Weight
900 L	120 cm	110 cm	170 cm	600 kg

Supplied with adapted stainless steel support

Artisanal Technical Ceramic

• Respect for the grape variety •

Aromatic precision •

• Preservation of fruit purity •

• Very low micro-oxygenation •

• Excellent thermal inertia •

• Great stability during ageing •

In addition to our range of natural ceramic vessels, we also offer technical ceramic jars, produced from assembled clay bodies and handcrafted by an Italian ceramic artisan based near Venice.

This range is distinguished by :

· **consistency of shape**

· **ease of maintenance**

The vessels allow direct contact between the liquid and the material, thereby promoting subtle, **controlled micro-oxygenation, slightly lower than that of an oak barrel.**

The addition of **grog** (clay fired at 1050°C, then crushed and sieved) to the clay body reinforces the vessel's structure.

Its clean, ovoid shape enables **vertical movement and random circulation of fine lees**, contributing to **increased roundness and mouthfeel.**

Simone in his atelier, Italy

Pure

Capacity	250 L	600 L	950 L
Height	95 cm	140 cm	150 cm
Diameter	75 cm	100 cm	125 cm
Weight	100 kg	220 kg	350 kg

Delivered on a wooden pallet,

equipped with :
tap (except for the 250 L vessel),
Ø 40 mm Mâcon-type valve.

"At Maison Damiano, every detail counts. We like to try, test, discover... To obtain singular wines, we know that the aging container can sublimate the juices.
Our Secret : the jars from Vin et Terre ! For 8 months, our Clairette Rose is aged in this jar, giving it an incomparable finesse and subtlety. By tasting our Pénates et Lares, you will discover this particular signature that makes our "little" white a unique tasting experience."
Maison Damiano

New

Granite

• Energy, purity, tension •
• Completely inert material •
• No aromatic transfer •
• No oxygen permeability •

A millennia-old material. Crystalline texture

This igneous rock, composed mainly of quartz, feldspar, and mica, is extremely dense and non-porous. Granite is a plutonic rock with a coarse-grained texture (from which it takes its name). Granite formed deep within the Earth through the slow crystallisation of magma.

Neutral and inert

It provides an environment comparable to stainless steel in terms of neutrality, while offering high thermal inertia (for example, it is used as whisky stones in place of ice cubes).

Thermal stability

Thanks to its mass and density, granite ensures :
Slow temperature variations
Stable fermentation conditions
Reduced need for temperature control

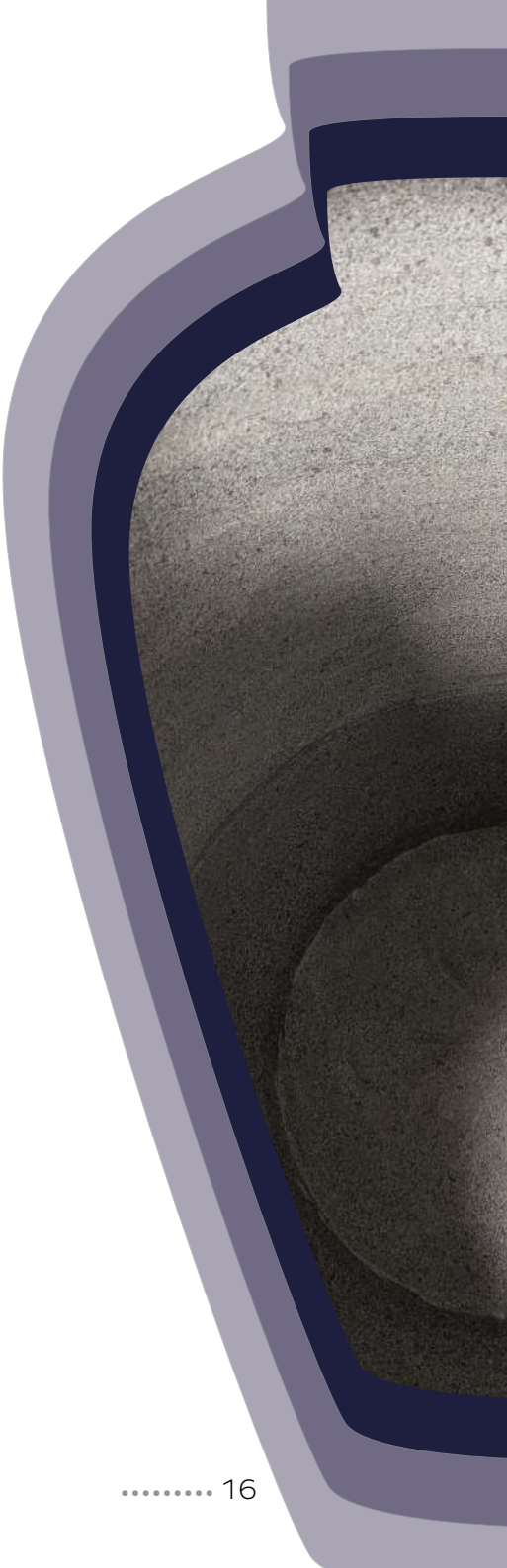
Timeless and unique

This material is over 300 million years old. It is virtually immune to wear over time. Granite is an extremely durable material.
Its crystalline structure has a beneficial effect on ionic activity, encouraging the development of numerous secondary and tertiary aromas.

PHYSICAL PROPERTIES

Density : 2.69 g/cm^3 | Compressive strength : 1,400 kg/cm^2 Porosity : 0.06% | Thermal conductivity : 2.812 W/m·K | Water absorption: 0.33%

Origin : Hubei Province.
The quarry is located in close proximity to the workshop.



Atelier Kevin Ceramics, China

Unique in the world

Jars carved from a single block of granite :
Exceptional durability
Structural strength

Tellurie

Capacity	360 L
Height	130 cm
Diameter	80 cm
Weight	300 kg

Supplied with :
granite lid,
silicone gasket and bung,
stainless steel locking system,
stainless steel pallet.

Optional Accessories

Aseptic hand-blown glass bung
24 cm
34 cm
45 cm

Stainless steel lid
Optional for stoneware and terracotta jars
of 500 L and above

Double stainless steel valve
with racking elbow
Optional for stoneware jars of 700 L and above
Excluding Divine

Stainless steel pallet
Optional for terracotta jars
Int 33 x Ext. 50cm | 47 x 67cm | 66 x 83cm

Rotating stand
For Ovo horizontal 300 L in stoneware
and horizontal Egg 225 L in terracotta

Customisation

Upon request, we customise your jars
with your logo.

From jar to bottle

Stoneware **J**ars

Stoneware Bottle

Capacity	Diameter*	Length**	Weight
75 cL	83,5 mm	26,3 cm	900 gr

Ø Col 18,3 cm ± 0.3 mm | * ± 2.0 mm | ** ± 1.5 cm

Purity and crystallinity

A stoneware bottle will not be discarded, but is often reused by the consumer.

Photo credits : Mas du Novi, Kristinus Borbitok, Château Pabus

Reception, use and maintenace of jars

RECEPTION AND INSPECTION UPON DELIVERY

! Fragile Materials !

Warning – National Carrier and Insurance Protocol !
Pay close attention to your suppliers' reception procedures. Unpack and inspect the jar entirely—inside and out—**BEFORE the carrier departs**. For every shipment, we now require recipients to film the general condition of the jar and its packaging (around the entire perimeter and underneath) as soon as the pallet is unloaded from the truck.

Follow the commissioning and use procedures strictly and promptly.

- Basic checks focus on the **visual aspect** ; using a flashlight is highly recommended to detect any potential cracks.
- **An acoustic examination**, by tapping the ceramic with a coin, will inform you about its physical integrity. If it rings clear like a bell, it is intact. A short, buzzing sound suggests an alteration in its structure.
- **A final olfactory examination** allows you to detect any potential contamination that needs to be treated before putting your amphora into service.

Following this initial check, **if you have the slightest doubt, record your observations as reservations on the delivery note before signing it and before the driver departs. Take photos; in the event of major and obvious damage, you may refuse the delivery.**

NB : From the moment you sign the delivery note, **the goods become your property in their current state, as you have mentioned in the reservations on the document**. Otherwise, by default, the goods are considered to have arrived and been declared compliant by you.

In a second phase, you have 48 hours to perform the additional water-filling test and declare any further reservations. This should be done immediately by telephone, then by mail/email with acknowledgment of receipt, directly to the transport company that delivered to you. In the event of a more subtle structural incident, compliance with this procedure and your initial reservations will guarantee the maximum chance of being covered."

HANDLING PRECAUTIONS

Our jars are delivered on pallets to allow you to move them with a pallet jack :
TERRACOTTA jars are delivered on wooden pallets.
STONEWARE jars are delivered with a circular stainless steel pallet.

When moving your jar, always work in **a team of 2 to 3 people**, using smooth and slow movements. Pay particular attention to placing it on the ground very delicately, which is possible with pallet jacks by lightly pressing the release lever at the end of the descent.

! Never move your jar when it is full !

Be careful not to place your jar on a plastic pallet ; the strength of plastic is in sufficient !

COMMISSIONING TIGHTNESS TEST !

Plan for 1 week of observation between the reception and the use of your jar. It is imperative to check the tightness of the jar before use !

This allows you to verify both that no damage invisible to the eye occurred during transport and that all accessories are correctly positioned and fixed. Check the proper compression of the internal and external seals of the bungs, lids, drain valves, and tasting taps. We advise you to thoroughly clean the silicone seal of the lid before any use with a non-chlorinated product.

TERRACOTTA being very porous, it also needs to be saturated with water before being used for wine.

To do this :

- **Pour water** until it overflows along the exterior walls to moisten the entire jar. Close the lid and finish filling via the glass bung if you are equipped with one.
- **When filling the vessel** with water or wine, ensure that **the jar is perfectly level** and not on an inclined floor. Otherwise, liquid pressure will be exerted on a specific point, which will, over time, cause seepage at that precise location.
- **Check the tightness of all your jar's accessories** (valve, tap, bung), the closing system, and all the walls of the jar.

Crédits photos : Sarrat de Goundy ©vidotflorian

On STONEWARE, technical ceramics, and granite, **a half-day test** is sufficient to check for tightness.

On TERRACOTTA, allow a minimum of **48 to 72 hours**.

If the water level in the jar stabilizes after 3 days, the jar is deemed watertight. You may then empty the water. Otherwise, continue adding water to saturate the jar's porosity.

If the 'consume' (evaporation/absorption) continues beyond 7 days, call your supplier at +33 (0)5 57 71 06 72.

TERRACOTTA : Tartaric Acid Seasoning

Terra Cotta has the potential to lower the acidity of wines during aging by neutralizing the wine's organic acids with the jar's calcium. Since the pH of musts and wines can be relatively low, we advise you to perform a tartaric acid seasoning to preserve their acidity.

To do this :

• **Spray a solution of Tartaric Acid (H2T)**, diluted at 150g/L of water. 3 applications on the internal walls of your jar are recommended, spaced out by a 24-hour drying period.

• **Rinse the inside of the jar** until the rinse water reaches the same pH as the water used before rinsing (close to 7).

PLACEMENT IN THE CELLAR

Your jar is now ready for the production of your beverage (vinification and/or aging). It should be carefully placed in the cellar, as **TERRACOTTA is particularly sensitive to its environment :**

• **In a cool place with a sufficiently humid atmosphere.**

• Avoid placing your jar in a walkway or in drafts.

• Ensure that the cellar atmosphere remains healthy.

If you place your **TERRACOTTA** jar in an air-conditioned room, spray it very regularly with pure water, as terracotta can dry out very quickly and draw wine from the inside to hydrate itself.

A relative humidity of 70 to 80% in the room is recommended for the production and preservation of your wines in terra cotta jars **to avoid excessive evaporation.**

*** The appearance of mold on the outer surface of the jar is possible and logical if the cellar atmosphere is humid. These traces should be treated as soon as they appear by scrubbing them with a hydrogen peroxide solution and then rinsing, or with ethyl alcohol.*

Photos Credits : Domaine Guillemot

TERRACOTTA : OENOLOGICAL MONITORING

Terracotta is very porous; at the beginning of the aging process, monitor the 'consume' and taste regularly so as not to be surprised by the jar's micro-oxygenation rate. The aseptic bung (airlock) will help you, as you will more easily see the change in liquid level or the start of fermentation.

Warning :**The volume of sulfur solution in the top bowl of the glass bung must not exceed the volume of the glass bell cylinder that covers the exhaust chimney.** Otherwise, when the cold season arrives, the reduction in wine volume risks sucking the sulfur solution into the jar and mixing it with the wine.

We recommend putting only 4 cm of solution in the bowl, just enough to dip the entire circumference of the bell and create the seal. The volume of the solution must not exceed the volume of the bell's body ; otherwise, when contracting during cooling, the wine may suck the SO2 solution into the jar.

Adding a few pinches of citric or tartaric acid helps make the solution more effective in its role of capturing oxygen.

CLEANING THE JAR

As soon as it is emptied, the interior must be cleaned. Ensure all deposits of must, lees, tartar, etc., are removed, even in the least accessible parts of the jar.

You may carefully lay your jar on its side against a shock-absorbing support (mattress, thick foam, etc.), provided it is thicker and higher than its base.

1) Water Rinsing

Use water at ambient temperature and/or a hot water pressure washer (Kärcher). Warning : Ensure a gradual increase in water temperature.

Avoid any thermal shock ! Steam generators are prohibited !

Also, be careful not to use a hot pressure washer around stainless steel parts integrated into the ceramic. Stainless steel has a different expansion coefficient than ceramic, which could cause cracks and fissures.

2) Cleaning and Removal of Organic Matter

(Organic acids, phenolic compounds, polysaccharides, polypeptides, etc.) even in the least accessible corners.

Use of Hydrogen Peroxide (H2O2)

Diluted in water (follow the manufacturer's instructions for use) : a strong oxidant that removes organic matter, disinfects, and removes red wine stains (destaining).

Photos Credits : Clos d'Elpis

Use of Sodium Bicarbonate* (1 part) + Citric Acid* (2 parts)**
Use this mixture in a 10% concentration solution.

• For example, add 66 g of citric acid to 33 g of sodium bicarbonate, then pour into 0.9L of water and mix.

The powders should be mixed dry. The effervescent reaction begins upon contact with water.

! Highly foaming mixture !

**Naturally biodegradable, no environmental impact.*

• Apply with a sprayer, let sit for 20 minutes, scrub, and rinse thoroughly with clean water.

DESCALING

SO2 :

• **Fill your jar with water.**

• **Inject 10g/hL of pure sulfur dioxide** in gaseous form into the bottom of the jar, with the lid closed, through the bung hole, and let it act for 4-5 days.

• **Rinse with a pressure washer** (Karcher), gradually increasing the temperature if necessary, always gently.

Warning :

**On Terracotta and porous technical ceramics,
the use of caustic soda (NaOH)
IS PROHIBITED.**

It is too difficult to completely eliminate from the deepest reachable pores. Traces could remain trapped despite cleaning and would risk contaminating the beverage of the following aging cycle.

We also advise against its use on STONEWARE, as it can be corrosive over the long term.

Despite this recommendation, if used, it is imperative to rinse thoroughly with a citric acid solution to neutralize all traces of soda. Once rinsed and drained, check the pH.

Your jar is now ready to be refilled with must or wine.

ALTERNATIVE DESCALING & CLEANING

Enzymatic solutions are currently being developed and tested in partnership with Alimpex.

MOOG Cleaning Wand Solution :

Important : If the jar is equipped with a hatch, neck, or any stainless steel accessory integrated into the ceramic, these components may expand under heat, potentially generating cracks or leaks.

We recommend using a high-pressure cleaner (HDS type), with a flow rate of 800 to 900 L/hr for **Terra Cotta** and 1,000 to 1,200 L/hr for **Stoneware**. Use the MOOG tank cleaner with a 400 or 600 mm extension depending on the height of the vessel. Use 5-degree flat-fan nozzles, size 02 to 05. Maximum pressure: 80 bars. Maximum temperature: 45°C on the cleaner setting for an initial 15-minute cycle.

If necessary, repeat with a second 15-minute cycle at a maximum of 55°C. Rinse with cold water only after allowing the ceramic to cool down for 30 minutes. For more details, visit our website.

STORING YOUR JAR (REMISAGE)

If you plan to leave your jar empty, certain precautions must be taken. After perfect cleaning and rinsing as described above : drain and dry it.

- **Place it in a dry area and never seal it**

(leave the lid resting but open, and keep the bung hole and valves open).

- You may also use a permanent fan.
- Ensure the atmosphere remains healthy, neutral, and free of incompatible odors** (TCA, TCP, no damp treated wood pallets or cardboard, no hydrocarbons, etc.).

If you have doubts about the hygiene of your jar, you may burn a sulfur wick (sulfuring), as you would for an oak barrel. Ensure the jar **is not wet** during this process to avoid the production of sulfuric acid!

Note : If a TERRACOTTA jar remains empty for a significant period, you must repeat the full cleaning and tartaric acid seasoning procedure before reuse.

In Summary : 3 Golden Rules for Using an Amphora :

1. No physical shock.

2. No thermal shock.

3. No caustic soda-based products in Terra Cotta.

Of course, ensure the vessel **is not hermetically sealed during any fermentation phase.** There is a risk the jar could explode before the pressure can even pop the bung.

Final Tip : Equipping yourself with a wet vacuum (liquid vacuum) will make every stage easier and prevent the risks involved in tilting or laying the jars down.

Photos credits : Frank John

Regulations

EC 1935 / 2004
EC 2023 / 2006

All of our natural terracotta and stoneware jars comply with regulations governing materials intended to come into contact with foodstuffs.

These regulations can be consulted at : www.economie.gouv.fr/dgccrf/

Supporting documents relating to this compliance are available upon request. V&T Amphores encourages users to ensure that their product complies with the maximum acceptable limits for substances as defined in the annexes of the current International Code of Oenological Practices of the OIV.

Composition | Art 2

The composition of the clay is essential, as it determines the firing temperature, the color, and the porosity of the jar. Our raw materials are composed as follows :

Terracotta

Si : 41% - Al : 17,54% - Ca : 20,90% - Fe : 11,83% - K : 3,13% - Mg : 4,56% - L.O.I. : 1,04%

Stoneware

SiO2 : 62,56% - Al2O3 : 18,29% - Fe2O3 : 7,09% TIO2 : 0,02% - CaO : 0,28% - MgO : 0,80% K2O : 2,22% - Na2O : 0,11% - L.O.I. : 6,46%

(Si = silica, Al = alumina, Fe = iron, K = potassium, Ca = calcium, Mg = magnesium, Ti = titanium, Na = sodium, L.O.I. – Loss on Ignition)

Origin | Art 2

Terracotta is a Tuscan galestro clay from Impruneta, Italy, protected by a certified designation (a terroir covering 200 km^2).

Stoneware is a sedimentary silicate rock originating from the Sichuan Valley (Red Basin quarries) in China.
Its exceptional texture is unique in the world.

These are natural clay terroirs that have been recognized for their suitability for food contact for centuries:

- **nearly 1,000 years for terracotta –** ageing and storage of olive oil and wines.

- **nearly 2,000 years for stoneware –** ageing and storage of wines and rice spirits, fermentation of fruits and vegetables.

Alongside these terroirs, pottery workshops developed, where artisanal know-how emerged and has been passed down through generations.

Traceability |Art 17

Each jar is numbered and corresponds to a clay batch number from a specific quarry layer.

Labelling |Art 15

The food-contact compliance logo appears next to the serial number.

Inertness |Art 16

Several COFRAC-accredited laboratories, such as Eurofins, SFC, and PH Labs SRL, are regularly consulted to analyze the inertness of our vessels (in particular to ensure the absence of heavy metal transfer). *All laboratory analyses carried out can be provided upon simple request.*

CO_2 Emissions

PRODUCTION

La terracotta is fired at 1000–1050 °C · **Stoneware** is fired at 1200 ° · **Glass** at 1400 - 1500 °

TERRACOTTA PRODUCTION

in France (2018)
4,136,864 tons -> 650,841 tons of CO_2
= 157 kg CO_2 per ton of terracotta

CO_2 emissions for a 200 kg terracotta jar
(500 L capacity) :

$\frac{157 \text{ kg} \times 200}{1000}$ = 31.4 kg de CO 2 for a 500 L jar

Per liter = $\frac{31.4 \text{ kg}}{500 \text{ L}}$ **=62.8 g**

Source : FFTB – Sustainable Development Report

STONEWARE PRODUCTION

In France in 2018 :
0.613 t of CO_2 per tonne,
i.e. 613 kg per 1,000 kg of stoneware ;

CO_2 emissions for a 200 kg jar
(500 L capacity) :

$\frac{613 \text{ kg} \times 200}{1000}$ = 122.6 kg de CO 2 for a 500 L jar

Per liter = $\frac{122.6 \text{ kg}}{500 \text{ L}}$ **=245 g**

Source : Transparencia.ascec.es – May 2015

CO_2 production for a GLASS bottle

By comparison : 345 g

Source : Express website - Mya 2015

TRANSPORT

CO2 Emission Comparison - one truck vs. one container for V&T AMPHORES :

A TRUCK typically carries :
20 jars of 300 kg each
= 6 tons

Example : Truck transport from Italy :
Florence - Bordeaux = 1,300 km

A truck emits on average
79 g of CO2 / tonne per km

6 t x 79 g x 1300 km
= 616,2 kg

Per jar :
616.2 kg / 20 jars per truck
= 30.8 kg

A CONTAINER typically carries :
20 jars of 250 kg = 5 tons
10 jars of 150 kg = 1.5 tons
Total = 6.5 tons

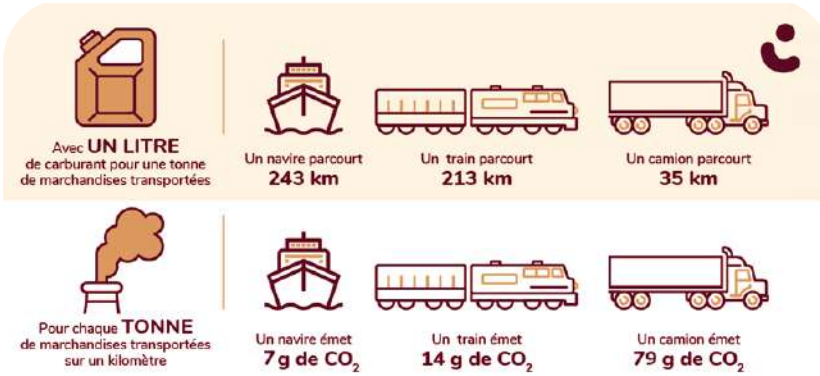
Example : Container transport from China :
Chongqing-Bordeaux = 12,600 km

A container emits on average
7 g of CO2 / tonne per km

6,5 t x 7 g x 12 600 km
= 573 kg

Per jar :
573 kg / 30 jars per container
= 19.1 kg

Sources : Emission factors for road transport were obtained from the ADEME database on emission factors for different road transport modes ("Etude – Facteurs d'émissions des différents modes de transport routier", available on data.gouv.fr). Factors for maritime transport (container ships) are derived from methodologies published by Clean Cargo and integrated into the GLEC Framework.
Other sources: Polytechnique insights - Comment réduire l'empreinte carbone du fret maritime. by Eric Foulquier, research lecturer, and Anaïs Maréchal, science journalist. - May 4, 2022



Study

The movement of the wine

· CELSIUS laboratory ·

Each material has a different capacity to transmit the external temperature to what it contains. If the material transmits little or no external variations to its content, we say that it is insulating.

This ability to transmit or not transmit temperature is called thermal conductivity and it is expressed in watts per metre-kelvin (Wm-1 K-1). Knowing this measurement is essential because it is the external variation of the temperature and its transmission - or not - to the liquid which will start the movement.

Here is the conductivity of the different materials usually used to contain wine :

Oak: 0.16 / Terracotta: 0.83 / Stoneware: 1.30 / Concrete: 2 to 5 / Stainless steel: 26

Sandstone and terracotta are therefore poorly conductive, so-called insulating materials.

Most fluids have a density which decreases with temperature. The colder a liquid is, the denser it will be.

In the presence of gravity (the force of attraction that sticks our feet to the ground), hot fluid is found above cold fluid. Thus, the surface water of lakes or the sea at rest is warmer than the water one metre deeper, and the air at ceiling level of a room is warmer than at floor level.

Therefore, for the movement of a liquid :

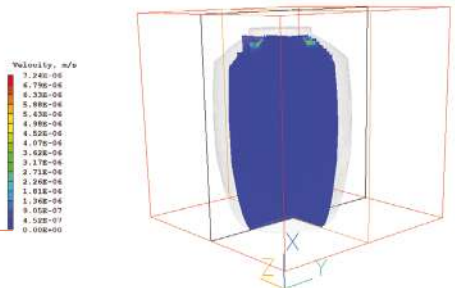
- **The temperature variation** outside the container is the energy given to the movement
- **Gravity** is the engine that allows liquidWs at different temperatures to move
- **The form is the accelerator or the brake.**

For there to be movement, there must be a change in temperature. If the cellar is perfectly insulated and heated/air-conditioned, there is no need to wait for the slightest movement since we are not giving the liquid energy to move. A temperature variation of 3°C, between the day and night for example, is sufficient to observe an interesting movement.

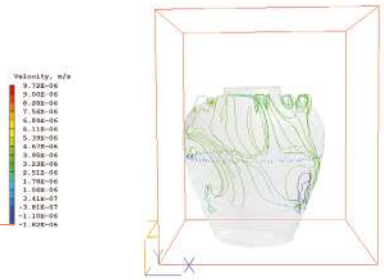
V&T AMPHORES used this 3°C gradient on stoneware jars to conduct a study on the movements of wine in different jar shapes by the Celsius laboratory, with the following results :

Shape of the V&T AMPHORES containers	Zen	Coralie	Ovo	Divine
Average speed in cm/day within the vessel, caused by a 3°C thermal gradient	8	43	60	130

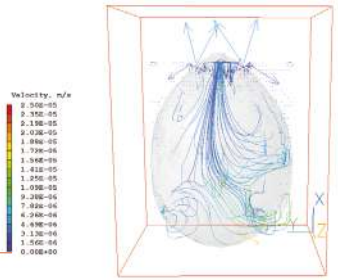
The angle on the top of the Zen acts as a brake and breaks the movement of the liquid inside the jar. With a Zen you will have very little movement and consequently a very straight, tight wine. This jar acts like a cocoon.



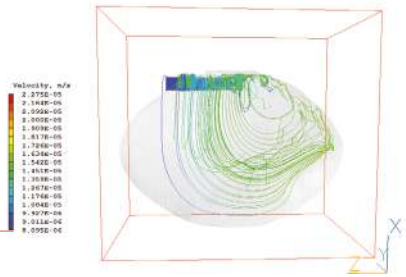
The rounded shoulders of the Coralie act as an accelerator and encourage a slight movement in random directions. This will bring roundness and fatness to the wine.



The Ovo allows mostly up and down movement with some random circulation. You'll have a quiet liquid with some uncertain agitation. If we were to compare the movement of the standing egg (Ovo) shape composed of other materials, we would have the following results : oak : 17cm/day | concrete : 52cm/day | stainless steel : 69cm/day



The Divine tank, with its elliptical shape, allows for speed propagation and therefore recirculation. Thanks to this movement, the liquid close to the wall is renewed allowing a little more interaction with the oxygen and the lees. Divine is the container that allows the most natural brewing.



Study

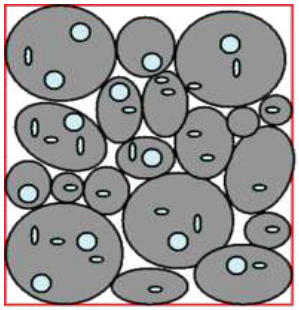
The porosity of our materials

Achieved in 2022 by the CALNESIS laboratory on terracotta, stoneware and technical ceramic samples

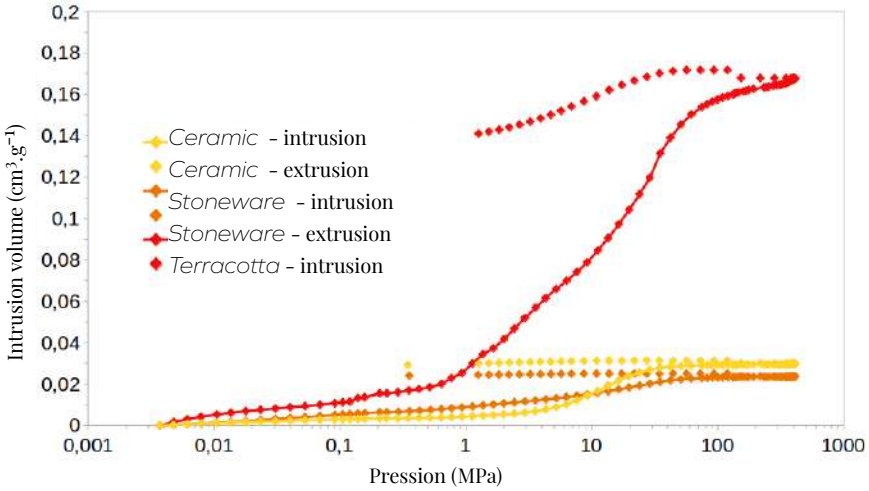
CALNESIS uses mercury, the only dense and remarkably mobile liquid metal with a non-wetting character, to introduce it into the selected material with a pressure ranging from 0.001 Mpa to 413 Mpa. (reminder: 0.1013 Mpa = average atmospheric pressure, 0.1 Mpa = 1 bar)

With mercury and such pressure, pore volume, porosity and pore size distribution can be well measured.

These intrusion volumes make it possible to define **a total porosity** of the material and approximately a porosity attainable by a liquid with its pressure in a neutral medium without other influencing parameters (temperature, humidity, fermentation gases, etc.)



Example and diagram of the porosity of a material



Mercury intrusion and extrusion curves for samples analysed in this study

TABLE SUMMARISING THE DATA COLLECTED BY THE LABORATORY :

500 l 3 jars	**Ceramic**	**Stoneware**	**Terracotta**
Total porosity (A)	6,70%	5,60%	31,80%
Jar weight (B)	180 kgs	200 kgs	170 kgs
Density (pbulk g/cm3 at 0.004Mpa) (C)	2,24	2,37	1,89
Volume of jar material (B/C = D)	80,4 l	84,4 l	89,9 l
Total pore volume (air) (DxA =E)	5,39 l	4,73 l	28,59 l
Maximum volume of oxygen for 500l (oxygen/air Tx =21%) (E x 21% = F)	1,13 l	1 l	6 l
Oxygen mass (1.354) for 500 l * (F x 1.354 = G)	1500 mg	1400 mg	8100 mg
Oxygen rate per litre (G / 500 l)	3 mg / l	2,8 mg l	16 mg / l

**density of oxygen at a temperature of 15°*

Terracotta contains potentially 5 times more oxygen than stoneware or technical ceramics.

Thanks to this high porosity, the terracotta jar allows more micro-oxygenation than stoneware or technical ceramics. **However, not all of this porosity is achievable** and the maximum solubility of oxygen in wine or water at a temperature of 15° is 10mg/ litre (winkler table).

What is surprising for an uninformed winemaker is the speed of dissolution of this available oxygen in the terracotta.

You will see in the following study how this oxygen is dissolved over time (7 months ageing).

Study

The micro-oxygénation rate

V&T AMPHORES commissioned **a study to characterise gas exchange through its jars.**

The study began on 18/06/2021 at the experimental winery of the **CHAMBRE D'AGRICULTURE DE LA GIRONDE** in a climate chamber regulated at 16° with a hygrometry rate of 70%.

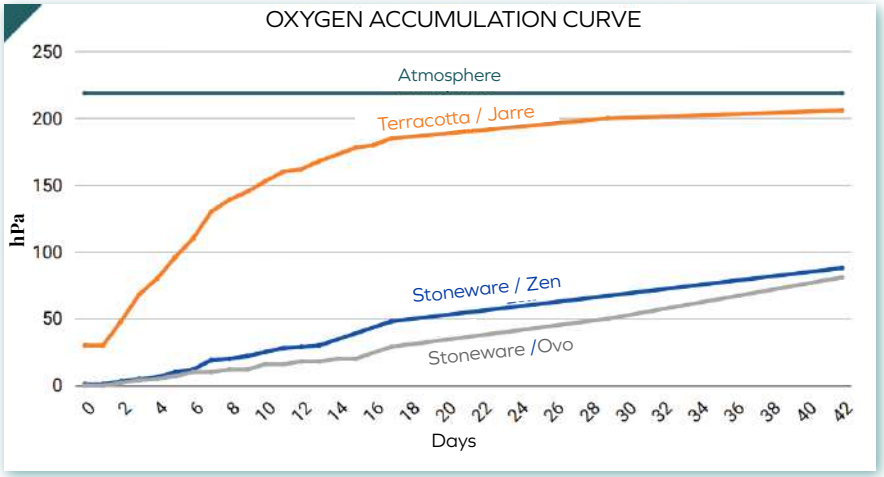
The first part of the test is carried out under nitrogen, the inside of the jars is cleaned of oxygen and then sealed. We wait for the return to equilibrium by taking measurements via probes placed in each container.

The second part of the test, lasting 7 months, consists of filling the jars with wine and monitoring its evolution.

The aim is to measure the precise **micro-oxygenation rate of each material (stoneware and terracotta).**

When the jar is empty, the pores of the vessel walls fill with oxygen, which then enables the micro-oxygenation of the wine.

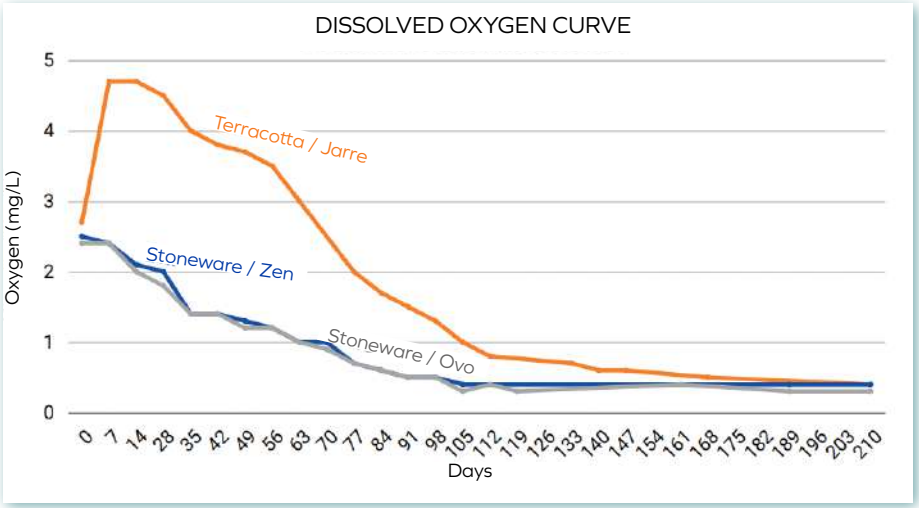
Results on nitrogen matrix



TERRACOTTA desorbs a lot of oxygen during the first 15 days (about 15 mg/L/month) and then stabilizes with an average rate of 1.5 mg/L/month. In the case of a wine that is going to consume this oxygen, we risk staying at a rate higher than 1.5 mg/L/month.

STONEWARE hardly desorbs oxygen and its oxygen transfer rate is stable at around 2.5 mg/L/month. This value is very close to the average value for a new barrel (1.8 to 2.3 mg/L/month).

Results on wine matrix



Conclusion

The study carried out with the Chamber of Agriculture has shown the behaviour of our materials with regard to their micro-oxygenating capacity.

TERRACOTTA is therefore significantly porous and allows the wines to open up and soften quickly. Consequently, its use requires close monitoring of the wines and adjustment of the ageing period for optimum results.

STONEWARE is a perfect complement because it desorbs little oxygen and micro-oxygenation remains diffuse and constant over time. The most fragile wines can be aged without the risk of premature maturation. The ageing periods can therefore extend from a few months to several years.

Despite the sometimes significant micro-oxygenating properties, it is very interesting to note that, in both cases, overprotection of the wines by increasing the SO2 doses is not necessary.

History of Terracotta jars

A Chronology of their evolution

Stone mortars, 13000 years BCE
Raqefet Caves, **Israël**

Ceramics, 7000 years BCE
China

Kvevry, 6000 years BCE, Georgia

Jars, 5400-5000 years BCE, Iran

The tradition of vinifying and ageing wine in earthenware jars has endured through the ages and across civilizations, albeit on a small scale and limited to certain countries.

Since the early 2000s, this trend has gained momentum. It's clear that this new boom is also a long-term one.

V&T AMPHORES is actively contributing to this trend, and is even developing this type of container for brewers and distillers, convinced of the many advantages of natural micro-oxygenation for the development of aromas.

Gin, vodka, and even beer are already being produced in our amphoras, in France and elsewhere.

When the best of ancestral traditions is adorned with the assets of modernity, the result is one of the most successful blends ever, isn't it?

Jars, 3100-2700 years BCE Egypt

Pithos, VIIe s AEC, Greece

Dolium, I-IIIe s. EC, Romain Empire

Tinajas / Talhas, years BCE, Spain / Portugal

(Non historical photo)

There is a civilisation of wine, one in which people seek to get to know each other better in order to fight less

Gabriel Delaunay

Testimonials

Gautier Roussille, Domaine Guillemot Michel :

We began using Vin et Terre jars in 2017, with a used 800L jar, for the fermentation and aging (11 months) of one of our Chardonnays. The result was so appealing that we now have 5 jars that improve year after year. Our Chardonnay in jars develops a great purity and a unique texture.

Thierry Thomas, Château Mas du Novi :

Vin et Terre represents authenticity and technicality ; or how to combine know-how with humanity... The stoneware jars represent a matrix of purity and finesse for very powerful wines. A rare vessel that combines thermal inertia and natural micro-oxygenation, resulting in wines full of precision and dimension [Stoneware Ovo].

Sur la photo : Paul Chatenay

Christophe Richomme, Laurent Collet, Champagne G. Richomme :

Le goût de l'expérimentation. Inspirés par l'innovation, nous aimons envisager de nouvelles techniques. Dernière en date : la vinification en jarre, rare en Champagne et encore peu courante en France, accueille une partie de notre vendange 2016. Une véritable première visant le développement des arômes du Champagne par le biais de la micro oxygénation naturelle du moût lors de la fermentation

Boris Générat, Distillerie des deux mers :

We are looking for a moderate, natural micro-oxygenation. The alcohol will remain clear. We already can't wait to let you taste this gem. Thanks to Vin et Terre for the horizontal [Lying] Ovos.

Clémence Pourtalès, Château Doyac :

Why the amphora ? Its porosity : the tannins soften, the wine mellows. Its inertia : the wine evolves slowly, which promotes the synthesis of fresh and fruity aromas. Its ovoid shape : it favors the suspension of fine lees and brings complexity and roundness to the wine. And they are magnificent !

Eddy Oostrerlinck-Bracke, Domaine de Juchepie :

Vin & Terre is a reliable partner, and after 7 years of experience with their stoneware jars, we are convinced that they perfectly meet our expectations...It is fascinating to taste how the stoneware jar sculpts wines that are so different, but just as exciting as in barrels.

Barbara et Christophe Grellier, Brasserie des Voirons (craft brewery) :

We have owned the jars since 2017 and use them to produce our fruit- or plant-based beers. They make it easy to carry out macerations between our beer and the fruits or plants. They also provide gentle micro-oxygenation, bringing a certain acidity or tension on the palate. They are also practical in terms of cleaning and easy to maintain.

Domaine Béatrice et Pascal Lambert :

To vinify in amphora means using earth as a vessel, preserving the purity of the fruit while respecting the terroir. It brings together two natural soils: the clay of Tuscany and the clay or limestone soils of our Chinon vineyards. The amphora, a natural thermal regulator, gives rise to a new balance between wine and nature (...). Thanks to Patrick Lalanne of vinetterre.fr, who supplies us with these beautiful vessels along with invaluable advice.

The different ceramic bodies

				COOKING	POROSITY	COLOUR
NATURAL CERAMICS	POROUS	Shard opacity Earthy fracture High porosity Difficulty to match with glaze T° enamel cooking < T° ceramic Low deformation	TERRACOTTA	900 C° to 1050 C°	8 to 30 %	Yellowish Red Brown
			FAIENCE	1050 C° to 1200 C°	5 to 12 %	Red Pink Beige Ecru
	VITRIFIED	Low porosity Deformation during cooking Scorching and cutting cracks	SANDSTONE VITREOUS	1100 C° to 1350 C°	0 to 6 %	Beige Ecru Brown
			PORCELAIN VITRO-PORCELAIN	1200 C° to 1400 C°	0 %	Ecru White
TECHNICAL CERAMICS	FIRECLAY	Resistance to temperatures Resistance to acidic and basic attacks Thermal shock resistance	FIRECLAY	1400 C° to 2000 C°	Various	Various
	SPECIALS	Resistance to electricity Inoxydable Resistance to temperatures and thermal shock Chemical resistance	SPECIAL CERAMICS	1400 C° to 3000 C°	Various	Various

Information provided by the University of Limoges

Glossary

Clay : A sedimentary rock, often soft, which, when mixed with water, can form a more or less plastic paste that can be shaped and hardens when fired. When the firing temperature exceeds 600°C, clay transforms irreversibly into ceramic. A ceramist therefore creates their pieces using clay. Today, very few use earth dug near their workshop; most buy clay in 5 to 10 kg blocks from wholesalers. These suppliers blend different clays in precise proportions (much like a cooking recipe). The terracotta and stoneware jars selected by V&T AMPHORES a re made by artisans who draw directly from quarries located near their workshops.

Ceramic : The name given to the discipline that manages the production of fired clay pieces. It is also the material from which these objects are made, but it also refers to the objects themselves. It is a generic term.

Natural Ceramics

· **Terracotta** · The raw material, clay, shaped and fired at temperatures above 600°C. It is the oldest form of fire art, which allowed the production of containers. Clay is fired at low temperatures: between 800 and 1020°C.

· **Stoneware** · As a category of ceramics, stoneware is made from clay with a high silica content (over 60%), known as "grès clay." Stoneware clays are sedimentary and vitrify at around 1100°C to 1350°C. Firing gives them a very dense texture, making them impermeable, denser, and stronger than terracotta. Stoneware pottery does not require glaze or coating to be watertight.

· **Porcelain** · Fired at high temperatures (between 1200 and 1400°C), porcelain is a non-porous ceramic. It is mainly composed of kaolin. Porcelain clay contains no oxides (elements that give color to ceramic), which accounts for its brilliant whiteness.

Technical Ceramics

Processed clays composed of various materials, additives, or other agents. These pastes use less water and provide better workability for more industrial production. They allow control over specific properties such as density, porosity, and the ability to withstand extreme temperatures. While less "authentic," they have their own advantages. Stronger and more uniform, they allow integration of complementary accessories in series, such as large, practical side doors for fermentation vessels, which are useful for winemaking.

Photo Credits : Pago De Los Abuelos

Team

Our team will do everything possible to meet your expectations and help you create beverages your customers will love. Let's continue the journey together!

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General terms and Conditions

Manufacturing Lead Times

Our jars are handcrafted. Their drying and firing processes in particular require significant production time. For customized pieces and items not in stock, please allow 3 to 5 months from the order date.

Delivery Conditions

All deliveries are made by appointment. If delivery does not occur within 2 months after the order, while the jar is available, storage fees of €30 per jar per month will apply. V&T Amphores reserves the right to apply additional transport charges in the event of : Absence at the delivery appointment, Change of delivery address after the order has been placed, Special requests regarding transport equipment (truck size, tail lift, etc.).

Funding options for your investment

We encourage you to explore funding opportunities available in your country. Contact your local agricultural or wine industry authorities for specific programmes :
Government grants for winery modernization and winemaking equipment,
Regional aid programmes,
Tax credits for organic or converting operations,
Leasing solutions,
Crowdfunding...

After-Sales Service (SAV)

V&T Amphores supports you from the choice of material to advice on maintenance after several years. We remain by your side throughout.

Photo credits : Bernard Magrez, Château Les Grands Chênes
Back cover photo : Domaine Guillemot Michel

V&T
AMPHORES
The greatest diversity

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