

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 ($\text{Wm}^{-1} \text{K}^{-1}$). 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 liquids at different temperatures to move
- **The form** is the accelerator or the brake.

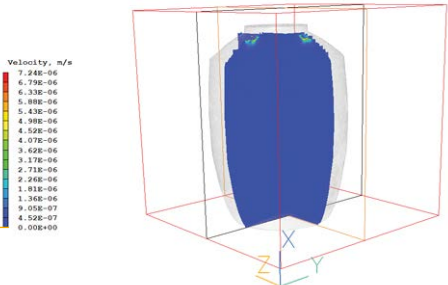
For there to be movement, there must be a change in temperature. If the cellar is perfectly insulated and heated/air-conditioned, there is no need to wait for the slightest movement since we are not giving the liquid energy to move. A temperature variation of 3°C , between the day and night for example,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

Vin & Terre 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 :

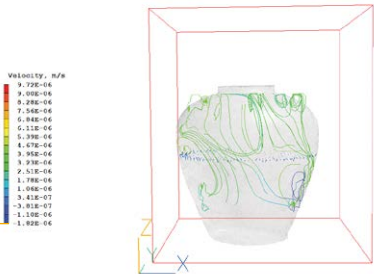
God only made water. But man made wine
V. Hugo

Shape of the Vin & Terre containers	Zen	Coralie	Ovo	Divine
Average velocity in cm/day in the container, caused by a thermal gradient of 3C°.	8	43	60	130

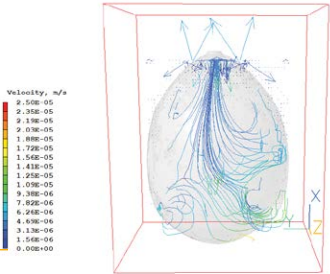
The angle on the top of the **Zen** acts as a brake and breaks the movement of the liquid inside the jar. With a Zen you will have very little movement and consequently a very straight, tight wine. This jar acts like a cocoon.



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.

