

## TURBOTANK

THE FERMENTER FOR LARGE MASSES FROM HL 600 TO HL 5,000 (1320.86 TO 132,086 GAL)

Among the many issues that affect the vinification of red grapes in large capacity tanks, one of the most important is certainly the implementation and management of pumping-over.

The punch-down technique is certainly one of the oldest in the oenological tradition. Laborde notes that this practice was known as early as the 1700s. The main purpose of this intervention is to extract polyphenolic substances from the crushed grape. According to studies by Prof. M. Feuillat of the University of Dijon, the breakdown of phenolic compounds in grapes can be summarized as follows (average over 12 grape varieties):

- Skins: 36% tannins and coloring substance
- Grape seeds: 38% tannins
- Pulp: 6% coloring substance

From the above, it is easy to understand the importance of processing the marc cap, even more so if we consider that "in red wine making, anthocyanins are extracted during the first few days of maceration and, consequently, the concentration of monomeric anthocyanins in the fermenting must quickly reaches its maximum value". (Mangani- Favilli- Buscioni- Vicenzini, University of Florence). Therefore, the use of different strategies or the availability of tanks such as Turbotank, which allow the programming of customizable processing cycles, is critical to the proper processing of red musts. Several variables contribute to the diffusion kinetics, including chemical ones, such as ethanol content, acetaldehyde, and probably other fermentation products, as well as physical phenomena, such as systems and mechanical interventions applied directly to the marc that has risen to the top. These latest statements by Prof. Di Stefano confirm the need for equipment that can be programmed both in terms of mode and time. The TURBOTANK system is designed to fully meet the needs of this new oenological technique. Equipped with a PLC, it can program the suction time and speed in order to intervene on the marc according to the different moments of maceration, following the oenologist's strategies.

Considering the crushed grapes in their basic components, i.e. the marc as a solute, and the must as a solvent, it is easy to understand the importance of the punch-down technique in order to obtain the maximum migration of substances from the solid fraction (marc) to the liquid fraction (must).

Consisting of a very simple device that exploits the principle of communicating vessels, TURBOTANK was built inspired by the recommendations of the philosopher H. D. THOREAU, who used to recommend: "simplify, simplify!" It consists of a stainless steel turbine that is inserted vertically in the center of the fermentation tank. The turbine patented by Albrigi Technologie, consists of piping with an internal central shaft, complete with propellers, driven by an axial gearmotor.

During the active phase, the must present in the lower part of the tank, under the marc cap, is sucked in and sent over the cap, achieving the flooding of the latter in a very short time and in a very large quantity. During this stage, it is possible to cool the must, since the outer tube of the turbine is provided with a cavity in which a cooling solution from a refrigeration system circulates.

This system is very effective because it is located in the center of the tank, certainly the hottest point of the entire mass, which is hardly affected by the action of the traditional external coolant jackets that are now installed on almost all tanks.

In the processing of dried grapes, crushed during the winter period, TURBOTANK can heat the must thanks to the cavity in the outer tube of the turbine. This heating process is supported by the external jackets, making it fast and significant.

During the passive phase, TURBOTANK acts as a vent, removing a large amount of heat and carbon dioxide. The elimination of carbon dioxide is not to be underestimated; in fact, the gas tends to stagnate in these large capacity tanks, which is detrimental to the fermentation process as it is a waste product of the yeast fermentation process. The construction design of TURBOTANK allows pumping-over with a very low production of lees, since the propellers in charge of the suction are programmed with a very low number of revolutions and do not exert any friction on the turbine walls. The lees, as a by-product, significantly increase production costs, slow down static clarification processes, and adsorb significant amounts of anthocyanins due to its solid nature.

The possibility of fitting fermentation tanks equipped with TURBOTANK with cap-breaking poles is another key feature. In fact, during the active phase, a large volume of liquid can be transferred over the marc cap in a short time: this results in an excellent flooding of the cap itself, but at the same time in a considerable lowering of its height inside the fermentation tank, with the consequent crumbling of the marc mass by the poles, which reduces compactness and therefore favors greater extractability.

Considering the real difficulty of maintaining the desired temperature in the center of the crushed mass, the cooling capacity of the turbine's outer tube, in combination with the cooling jackets, can be used for cryomaceration of both white and red grapes. With this technique, thanks to the intervention of B-glycosidase enzymes, the typical varietal characteristics of non-aromatic grapes can be expressed.

Another prerogative of fermentation tanks equipped with TURBOTANK is the presence of a micro-macro-oxygenation station, which allows them to perform:

- macro-oxygenations during fermentation in the active phase of the turbine, to ensure the vitality and renewal of the yeast cells involved in the fermentation that, in the case of dried grapes, can continue for many days and with the development of high alcohol contents.
- micro-oxygenation as fermentation comes to an end. The purpose of this technique is summarized by Prof. Moutounet's statements: "It is well known that phenolic compounds are mainly responsible for the consumption of oxygen in wine. As a result of the action of oxygen, they undergo various chemical transformations; a key compound in the evolution of the coloring matter in red wines is acetaldehyde, which is produced by the oxidation of ethanol and which, acting as a bridge in condensation reactions between anthocyanins and tannins, effects the formation of very colorful and stable compounds. Another fundamental advantage of the micro-oxygenation technique is the disappearance of plant traces and an increase in reductive power thanks to the structuring and harmonizing stages, which lead to an increase in aromatic complexity."

Minimal maintenance and easy daily cleaning, quick and easy installation thanks to its technical features, make TURBOTANK the ideal partner for large cellars that want to manage the automatic, safe and technologically advanced pumping-over in large capacity tanks, whether in stainless steel, enameled iron, fiberglass or concrete, whether new or existing.

Finally, TURBOTANK can be used as an agitator when blending different types of wine or as a mixer when adding oenological products.

### Turbotank

