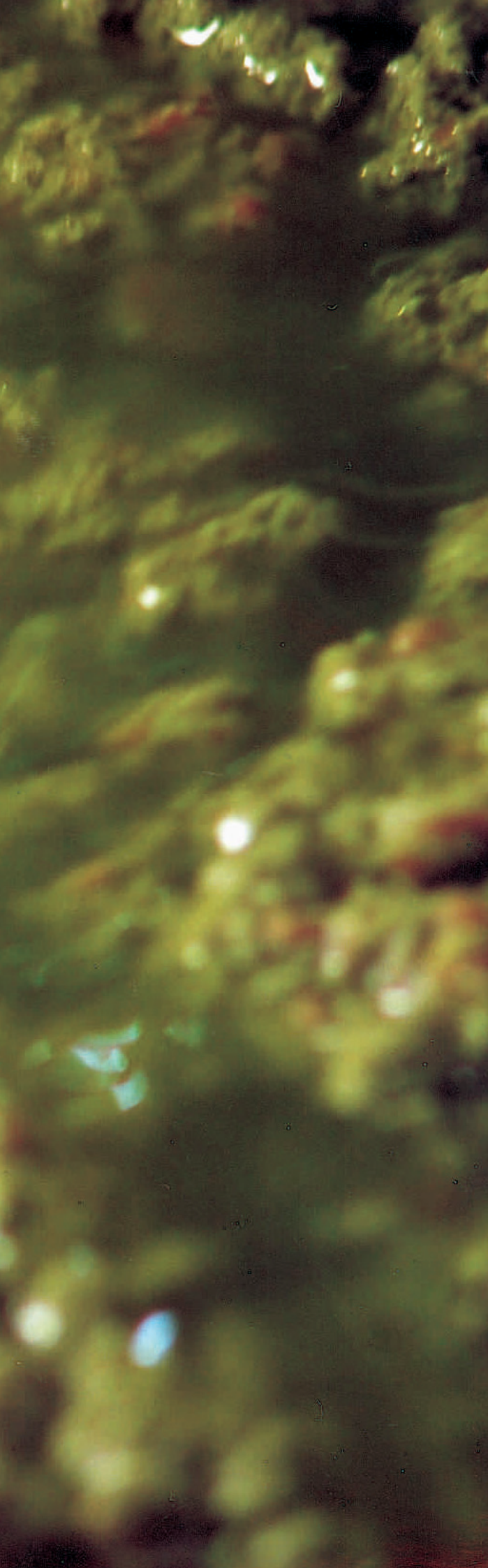


CRUSHING
& MALAXING



PIERALISI
CIRCULAR THINKING





Crushing and malaxing

An olive oil's potential, in terms of flavour and organoleptic characteristics, is developed during the crushing and malaxing phases.

The olive drupe crushing and paste heating processes must be performed with extreme care using machinery that, on the one hand, prevents oxidation or deterioration and, on the other, enhances the most important properties of the olives.

Pieralisi: innovation and know-how dedicated to quality since 1888

Passion, tradition and innovation. These have been the core values of the Pieralisi Group since 1888, when its first workshop opened in the small town of Monsano. Today, the Pieralisi Group is the world leader in providing state of the art separation solutions using centrifugal force.

Pieralisi systems deliver optimal performance - both for **continuous cycle** and **batch processing** - enhancing, on one hand, the quality of the oil, which is even richer in polyphenols and, on the other, making it possible to harness the full potential of the by-products so they can be another source of income for the oil mill.

With Pieralisi Group's long-standing experience in the industry, it is the only one of its kind able to supply its customers, all over the world, with **a turn-key product** for the **entire olive processing cycle**: from leaf removal to washing, to crushing and malaxing, followed by extraction and separation.

The Pieralisi Group continuously invests in innovation. It has filed hundreds of **international patent applications** (25 are currently active), which embody and demonstrate its commitment to the research and development of new technologies.





Safety and assurance for excellent results



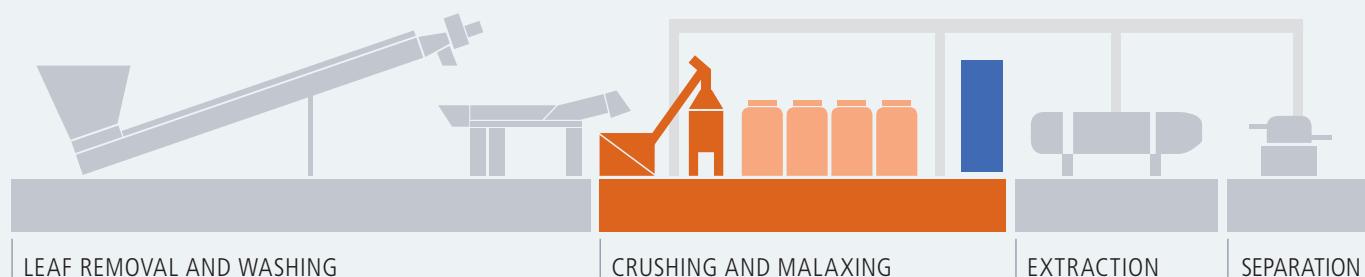
Safety and assurance play an increasingly important role in a world where mechanical engineering is becoming increasingly complex.

This is why PIERALISI, UNI EN ISO 9001 and UNI EN ISO 14001 certified, takes great care in the design and manufacture of its machinery in accordance with quality assurance and safety standards to ensure compliance with key directives such as the Machinery Directive 2006/42/EC, the Low Voltage Directive 2014/35/UE, the Electromagnetic Compatibility Directive 2014/30/UE and the ATEX Directive 2014/34/UE.

The control panels, designed in accordance with strict quality and safety standards, are custom built in order to meet the specific requirements of each stage of the production process.

Oil mill operations are facilitated by the highly intuitive devices and the correlation between the panel and system which is simple and easy to understand, focusing in particular on the safety indicators. PIERALISI's advanced control systems can be linked to other machinery at the oil mill to create an extensive digital network and are also set up for remote communication, if desired. PIERALISI issues CE certification pertaining to the entire oil milling system during installation which is further proof of the attention it pays to the needs of the oil miller and its company.





Crushing



The crushing and malaxing processes are the starting point of the most delicate phases in the olive oil production process.

The quality of the oil, how the flavours develop, and the oil extraction yield depend on the type of crushing and the subsequent malaxing phase.

The olives must be properly crushed in order to:

- facilitate the extraction of oil and important minor compounds;
- break the kernels into appropriately sized fragments to ensure more effective malaxing and more efficient centrifugal extraction;
- minimise oxidation of the paste (reduced peroxide).

The design and quality construction of PIERALISI crushers ensure seamless processing, keep temperatures down and they are able to adapt to the different types of olives. Unlike other crushers, usually equipped with a fixed grid, PIERALISI crushers are also equipped with a unique **counter-rotating grid**. The outwardly flaring holes of this grid facilitate expulsion, reducing the number of peroxides in the oil caused by the pulp rubbing against the metal, and also decrease wear of the parts. The shape of the hammer and grid ensure uniform particle size and that the olive kernels are crushed into sharp slivers, which is extremely important for the subsequent phase of malaxation.

PIERALISI crushers are available with a single grid (2800 rpm) or double grid (1400 rpm) to suit the different olive cultivars or the different requirements of the producer and, in doing so, manipulate the bitter and spicy tones of the olive produced. The bar grid is a preferred solution as it increases crushing capacity by 30% and reduces energy consumption.

All parts coming into contact with the olive and paste are made of stainless steel and are fed into the machine via a screw elevator which, thanks to the tronco-conical shape, allows the olives to move smoothly without piling up.

There is no doubt that PIERALISI hammer crushers are the best solution for millers who want to get the best quality and highest yields of olive oil.



The advantages of PIERALISI crushing systems



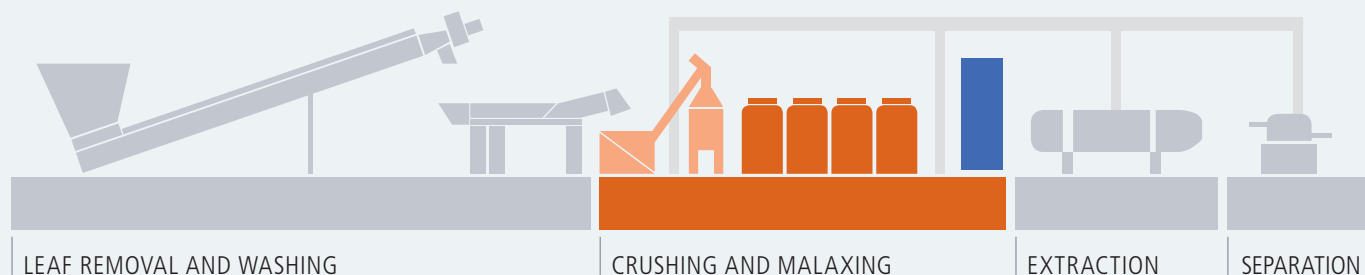
Crushing

- Capable of varying the sensory attributes of the oil by enhancing some organoleptic and aromatic characteristics. The various crushers are equipped with inverters used to change the rpm of the main motor and consequently the hammer/blades impeller.
- Maximum yield with minimum energy consumption.
- Seamless processing ensured by the quality design and construction which keeps the temperature down and is suitable for different types of olives.
- Using PIERALISI technology, the crusher is equipped with a control system that ensures maximum crusher performance with no need to worry about pesky blockages or lost time to fix the issue.
- Practically noise-free due to its sturdy design, precision in construction and special external soundproof coating solution.
- All parts coming into contact with the olive and paste are made of stainless steel.

All PIERALISI crushers are equipped with a **counter rotating grid** which, by generating a centrifugal force, facilitate the outflow of the pulp. The grid also features **outwardly flaring holes** designed to reduce paste friction and increase the durability of the grid.

Pulp is pushed out of crushers that do not have these features only through the pushing action of the hammers. This increases the peroxide value caused by the friction created in the paste and causes the grids to wear out quicker.

The hammers, equipped with interchangeable plates made of hardened metal, and the contour of the perforated grid ensure that the oil pockets break perfectly and that the kernels are crushed in a uniform manner.



Malaxing



The next step in the process is called malaxation. This phase completes the development process of flavours and the organoleptic properties of olive oil started in the crushing phase. Malaxing involves slowly stirring the paste while it is thermal conditioning which causes the microscopic oil and water drops to coalesce, forming increasingly larger drops. The shape, volume and size of the paddles and the number of revolutions are key factors in obtaining the maximum yield and quality.

Pieralisi malaxing systems are composed of independent malaxer unit, suitable for both batch processing and industrial processing, designed to operate at different temperatures and speeds.

The optimum diameter of the Pieralisi malaxing tanks ensure top performance in heat exchange, reducing the possibility of the formation of emulsions. Larger volumes may reduce the efficiency of the heat exchange and require a longer malaxing time for the paste to achieve the optimal temperature. This can result in a loss in output of the process and a deterioration in the quality of the oil due to fermentation which may give it a winy taste and cause the very important values of alkyl esters to rise.

The particular geometry of the paddles, the different diameter of the two blades and the angle of rotation make it possible to mix the paste thoroughly. The rotation speed is set to prevent emulsion.

The fully independent units are made of stainless steel, and have double walls for hot water circulation. Each unit is equipped with probes to check the minimum/maximum level and temperature of the paste and also feature an automatically operated butterfly for draining them.

Each unit has a washing system that operates on demand or at the end of processing each batch of olives.

Pieralisi malaxing units are second to none. As a matter of fact, they are built according to the highest standards in terms of efficiency and effectiveness, ensuring the absolute lowest malaxing times and dramatically improve the quality of the oil. The Pieralisi Group produces tanks for 600 ÷ 2000 litres to meet all needs: from small batches to industrial-sized quantities.

The top-of-the-line models allow the traceability of all parameters of the batch being processed.



The advantages of Pieralisi malaxing

Malaxing

- Maximum energy efficiency and reduced malaxing times thanks to the optimum diameter.
- No wastage since the paste is fed into the tank by means of a three-way valve.
- The modular design of the malaxer makes it possible to add even just one unit based on the miller's requirements.
- Control of process parameters via an electronic control panel with a computerised touch screen.
- Processing can be done in each tank at different temperatures.
- Special automatic washing systems to ensure that each batch is not contaminated by the previous batch.
- The tanks are equipped with an electronic flow meter which measures the water added in three-phase processing and the draining process after each batch. A special device stops the pump if there is not enough water.





HP 30

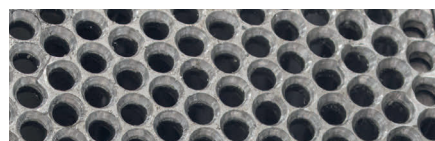
SINGLE GRID CRUSHER

	installed power kW	L mm	W mm	H mm
Crusher HP 15	13.6	1455	620	830
Crusher HP 30	24.6	1620	620	830
Crusher HP 40	32.6	1690	620	830
Crusher HP 50	39.6	1730	620	830
Crusher HP 60	47.6	1800	650	830

The Pieralisi crusher, rotating grid (2800 rpm) and counter-rotating grid, is the father of all crushers, and even today the only crusher able to guarantee the best yield and quality of oil. The grids with flared holes are easily interchangeable and are available in different hole diameters ranging from 5mm to 8mm with 0.5mm variations depending on the size of the olives and, where necessary, the different taste of the olive oil requested. 6-blade impellers equipped with special notched plates and the innovative bar grid that can reduce energy consumption by 30% are available on request.

All Pieralisi crushers are entirely made of stainless steel, equipped with an inverter and a stand. The specially designed sound insulation keeps noise down to a minimum during processing.

Single grid



standard



optional



HP 30

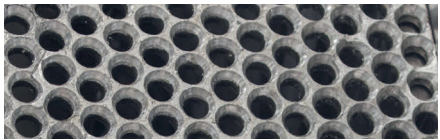
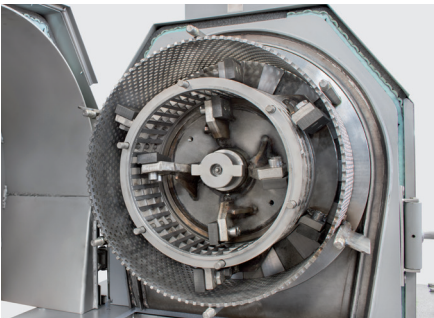
DOUBLE GRID CRUSHER

	installed power kW	L mm	W mm	H mm
Crusher HP 30	24.6	1700	620	830
Crusher HP 40	32.6	1760	620	830

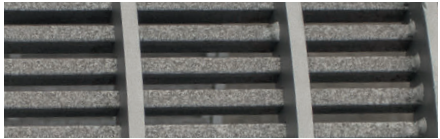
For special conditions, e.g. a request for milder oil in order to meet the demands of some customers, PIERALISI recommends a double grid which makes it possible to produce a more mild and delicate olive oil. These crushers are suitable for processing olive cultivars with a high concentration of polyphenols. The crusher reduces their extraction time whilst ensuring an excellent yield even if it is lower than that of a single grid crusher and a lower amount of hours worked. The grids with flared holes are easily interchangeable.

All PIERALISI crushers are entirely made of stainless steel, equipped with an inverter and a stand. The specially designed sound insulation keeps noise down to a minimum during processing.

Double grid



standard



optional

The measurements shown refer to **L**: total length; **W**: total width; **H**: total height



Simplex 800

SIMPLEX SERIES

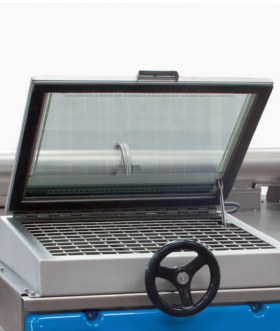
	installed power kW	capacity L	L mm	W mm	H mm
Simplex 600	0.75	600	1900	710	1180
Simplex 800	0.75	800	2400	710	1180
Simplex 1000	0.75	1000	2900	710	1180
Simplex 1200	0.75	1200	2900	710	1290

The SIMPLEX malaxing system is the perfect solution for batch processing. It combines technological innovation with ease of use and guarantees the high PIERALISI quality standards in terms of materials and performance at a competitive price.

- The fully independent malaxing units are made of stainless steel and have a double wall for hot water circulation.
- The tanks are fed through a stainless steel screw conveyor with hand-controlled sash hatches specifically designed to guarantee a perfect seal and manually operated. The tanks are equipped with max level sensors.
- The tanks are drained via a pneumatic butterfly valve operated by means of a hand lever. Both the scroll and the mono pump, fed through the valve, are equipped with an inverter to adjust the flow rate.

The malaxers, with front panels made of ABS, have a greater overall internal volume and are lower in height from the ground to get better view of the paste during processing.

All Simplex malaxing units are equipped with shatter-proof, non-fogging glass inspection door with LED lighting system and sash hatch with control on front side for the feeding of the paste.



The measurements shown refer to a single malaxer **L**: total length; **W**: total width; **H**: total height



Molinova TG 800

MOLINOVA TG SERIES

	installed power kW	capacity L	L mm	W mm	H mm
Molinova TG 600	0.75	600	2150	710	1420
Molinova TG 800	0.75	800	2650	710	1420
Molinova TG 1000	0.75	1000	3150	710	1420
Molinova TG 1200	0.75	1200	3150	710	1530
Molinova TG 2000	2.2	2000	3650	998	1960

The Molinova TG malaxing unit, suitable for both batch and continuous processing, consists of completely independent malaxer units that guarantee considerable energy saving, given the fact that it is possible to run only the tanks needed, and keep the other ones off.

- The malaxers are made of stainless steel, and a double wall for hot water circulation.
- Each malaxer has an inspection dome, made of shatter-proof, non-fogging glass, fitted with a safety lock device and a new LED lighting system for easy inside inspection.
- The paste is dispensed to the malaxers via three-way pneumatic valves, made of stainless steel, with a special draining and washing system. Unlike two-way valves, three-way valves allow the malaxers to be filled in an efficient manner, preventing the paste from spilling into the other malaxer units and mixing with olive batches from other customers.
- The malaxers are thoroughly cleaned at the end of each batch thanks to the hydropneumatic draining and washing system and a rear opening for easy access.



MOLINOVA ORO SERIES **END-OF-LINE**

	installed power kW	capacity <i>L</i>	L mm	W mm	H mm
Molinova Oro 600	0.75	600	2150	710	1420
Molinova Oro 800	0.75	800	2650	710	1420
Molinova Oro 1000	0.75	1000	3150	710	1420
Molinova Oro 1200	0.75	1200	3150	710	1530
Molinova Oro 2000	2.2	2000	3650	998	1960

The measurements shown refer to a single malaxer **L**: total length; **W**: total width; **H**: total height



END-OF-LINE

Molinova Oro 800

Molinova Oro malaxing system, designed for batch processing, are completely automated and are also able to operate in continuous mode. The malaxer units are made of stainless steel and have a double wall for hot water circulation. Each one has an inspection dome, made of shatter-proof, non-fogging glass, equipped with a safety lock system and a new LED lighting device for easy inside inspection.

Each malaxing tank, devised to operate at different temperatures, is equipped with a stainless steel automatic butterfly valve for discharging paste and with min/max level and temperature sensors.

Each malaxer has a timed washing system that operates on demand or at the end of processing each batch of olives.

- More flexibility in the arrangement of the malaxer unit; customers, on the basis of their needs, can add even just one unit.
- Each malaxer has its own motor, so the oil miller can run just one and leave any others off.
- The insulated malaxers with independent heating, controlled directly by the temperature probe in contact with the paste, help save energy and lead to a higher yield and quality of oil.
- Thanks to the independent nature of each malaxer unit, the oil mill operator can run the washing system for each unit and blades as necessary, thereby improving the quality of the oil.

Each malaxing tank is equipped with a standard rear washing door.



All Molinova Oro malaxers are equipped with touch screen monitor on swivel arm so the operator can easily control the system from any point.



SPAIN SERIES

	installed power kW	capacity L	L mm	W mm	H mm
Malaxer D 1250 - 6000 L	4	6000	5080	1360	1770

The measurements shown refer to a single malaxer **L**: total length; **W**: total width; **H**: total height



Protoreattore® Pieralisi the new era of Malaxing



With **Protoreattore®** the **Pieralisi Group** has gained supremacy in the field of machines for the production and extraction of olive oil. A unique system in the world olive oil market revolutionizing the traditional process of malaxing ensuring important advantages both in the processing of continuous and batch production. Not to be confused with a simple heat exchanger, the **Pieralisi Protoreattore®**, also able to cool the paste, is the result of passionate engineering work determined to solve the two principal variants of traditional malaxing which, as is known, are responsible for the quality of the final product: time and temperature.

The higher quality of the processed product, also in terms of nutritional and sensory characteristics, are in fact, due to the drastic decrease in the malaxing time and the automatic management of the malaxing parameters. The processed oil result is seen by clear and measurable data: an increase in the presence of polyphenols, improved organoleptic quality and greater sensory stability over time. A technological revolution that enables the world's olive oil to make a major new step in the evolution of excellence and efficiency.



High quality
Maximum efficiency
Reduced investment

Lower investment costs

On an equal flow rates, thanks to the consistent reduction of malaxing volume (tanks), the Protoreattore® offers a reduction of initial investment costs.

Energy Saving

The reduction of the processing times results in a reduction of the electrical / heating costs estimated around 25%.

Organoleptic qualities

The internal process of the Protoreattore® does not require the addition of water and this, combined with the limited contact with oxygen, preserves the valuable organoleptic quality of the oil and its sensory stability in time.

Correct coalescence of the particles

Unlike the conventional heat exchanger, the Protoreattore® is an innovative malaxer which guarantees the optimum coalescence of the particles.

Reduction of alkyl esters

Reducing the amount of time spent as paste avoids the fermentation of sugars and the consequent harmful formation of alkyl esters. The tests on the final product, in fact, confirms a significant reduction of their presence.



Continuous production

PROTOREATTORE® LC 3+3

TANKS **SIMPLEX 1200+1200**

Capacity up to **6 t/h**



* **PROTOREATTORE® LC 3+3**

TANKS **MOLINOVA ORO 1200+1200**



PROTOREATTORE® LC 3+3

TANKS **SIMPLEX 2000**



PROTOREATTORE® LC 5+5

TANKS **SIMPLEX 2000+2000**

Capacity up to **16 t/h**



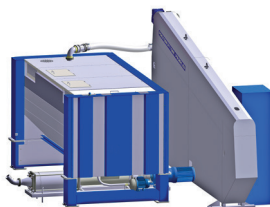
PROTOREATTORE® LC 5+5

TANKS **MOLINOVA ORO 2000+2000**



PROTOREATTORE® LC 5+5

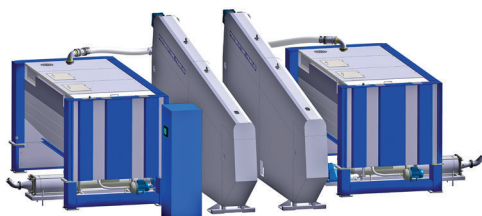
TANKS **SPANISH TYPE 4000**



PROTOREATTORE® LC 5+5

TANKS **SPANISH TYPE 4000+4000**

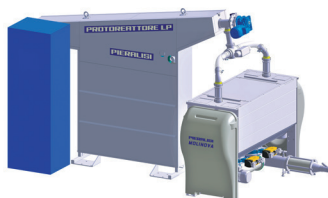
Capacity up to **25 t/h**



Batch production

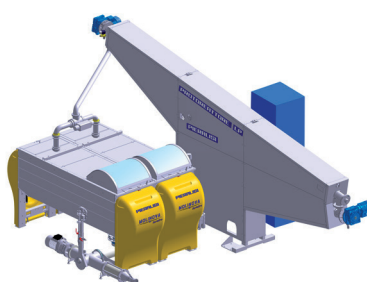
PROTOREATTORE® LP 3

Capacity up to **750 kg/h**



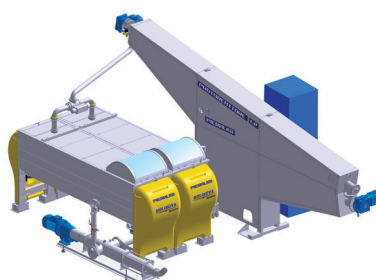
*** PROTOREATTORE® LP 4**

Capacity up to **2 t/h**



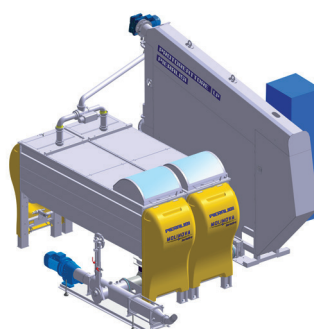
*** PROTOREATTORE® LP 5**

Capacity up to **4 t/h**



*** PROTOREATTORE® LP 6**

Capacity up to **6 t/h**



All models are equipped with touch screen display for optimal process management

*** tanks also available in MY BLEND SX version.**



ELEVATOR WITH HOPPER

installed power kW	Lengths available
1.1	2.25 m - 2.60 m - 3 m - 3.40 m

The tronco-conical shape of the hopper on the Pieralisi screw conveyor prevents olives from piling up. The scroll is driven by a gearmotor that automatically adjusts the feeding rate of the crusher based on the absorbed power of the main motor ensuring that the crusher is always able to operate under the best conditions.







Via Don Battistoni, 1 - 60035 Jesi (AN) Italy
Phone +39 0731.2311- Fax +39 0731.231239
www.pieralisi.com - info@pieralisi.com