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FRUIT AND VEGETABLES

Fruit and vegetables

and obtaining high quality products. nutritional quality of the finished product.

1. Citrus fruit juice

- 2. Essential citrus fruit oils
- 3 . Apple and pear juice
- 4 Peach, apricot, prune, kiwi juice
- 5. Berry juice
- 6 Mango, guava, papaya, lychee juice
- 7. Tomato and carrot juice
- 8. Grape juice
- 9. Pineapple juice



Juices extracted from fruit and vegetable are vital to hydrate and keep our body healthy. They enable the preservation of corporeal pH, the prevention of disorders and diseases.

The choice of raw material is as important as the necessary technologies for processing

The great experience, acquired over the years from Pieralisi, offers a wide range of solutions for the extraction of fruit or vegetable juices and purée, granting the best

Our wide range of separators and decanters perfectly fits to any kind of raw material, both fruit and vegetable, and to any kind of production process.

. Citrus fruit juice





9 Process section involving Pieralisi technologies

Waste and Sandar Washing water treatment

Example of process flow diagram





Example of process flow diagram

Fruit and vegetables: Processes





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		Waste and washing water treatment	6	
		Tank bottoms recovery	9	
		Examp	le of process flow diagram	

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5 Berry juice





9 ocess section involving Pieralisi technologies

Example of process flow diagram







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Clarified

juice

Example of process flow diagram

Tomato and carrot juice











Pineapple juice

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A complete line for extraction and clarification of fruit and vegetable juice consists of the following components:

- 1 . Decanter centrifuge
- 2 . Control panel for decanter centrifuge
- 3 . Back-pressure valve
- 4. lank
- 5 . Centrifugal separator
- 6 . Control panel for centrifugal separator
- 7 . Solid conveying system





4. Tank

	Clarified juice	>
	TYPICAL VALUES 1÷4% SS (v/v)	
ator		
	Solid	>
	TYPICAL VALUES 18÷22% DS	

Double juice extraction and clarification

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Fruit and vegetables: Extraction and clarification



A complete line for extraction and clarification of fruit and vegetable juice consists of the following components:

1 . Decanter centrifuge

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- 2 . Control panel for decanter centrifuge
- 3. Mixing scroll
- 4. Stirred tank
- 5 . Decanter centrifuge
- 6 . Control panel for decanter centrifuge
- 8 . Centrifugal separator
- 9 . Control panel for centrifugal separator
- 10. Solid conveying system





 Solid	>
TYPICAL VALUES 18÷22% DS	-

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Essential oils concentration and purification **S**





- 1. Stirred tank
- 2 . Centrifugal separator
- 3 . Control panel for centrifugal separator
- 5 . Centrifugal separator
- 6 . Control panel for centrifugal separator





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Decanter centrifuge

Pieralisi decanter centrifuges are based on a modern technology that contact with the air and the consequent oxidation phenomena or foam combines the ability of treating high solids content products with an excellent formation. Another specific advantage of the centripetal pump is to allow clarification efficiency. Separation performances are related not only to the continuous regulation of liquid exit level during operation; this option mechanical details but also to operating parameters (centrifugal force, flow bestows to the decanter a great versatility, which results essential for an rate, differential speed, liquid levels) and to the specific characteristics of optimal management of the performances mainly in presence of products the product (density, viscosity, guantity and dimension of solid particles). A with variable concentrations and main motor connected to the decanter shaft drives the bowl rotation. The characteristics. The centripetal pump extremely high centrifugal force generated inside the bowl is proportional to the rotational speed and to the bowl diameter. The product to be clarified enters through the feeding pipe, it passes in the diffuser to be distributed at the centre of the bowl and then it is accelerated. The centrifugal force the beverage sector. Pieralisi's CPA acting on the solid particles is responsible for the solid-liquid separation. Every decanter centrifuge can be tailored to any specific application, selecting between the different available configurations, components and devices. The centripetal pump (a) and the solid scraper (b) are the most common systems used in food applications.

Adjustable Centripetal Pump (CPA)

In order to satisfy the specific needs of some applications and provide better performances and greater operating flexibility, Pieralisi has developed a special device called Adjustable Centripetal Pump (CPA), that allows to discharge the clarified liquid from the bowl. The use of the centripetal pump, integrated in the decanter liquid side terminal, permits to have the clarified liquid outlet under pressure, minimizing the

Back pressure valve



In presence of liquid discharged by means of the centripetal pump, it is possible to control the clarified liquid pressure through a dedicated control valve (manual or automatic). The aforementioned regulation, besides sending the product to a certain distance from the discharge point without using any external pump, it significantly contributes to a more precise control of the clarified liquid quality that is obtained from the separation process.

uniqueness and peculiarities make Pieralisi's CPA decanters particularly fit for the food industry, above all in centrifuges are available in both 2 or 3 phases version.



The dehydrated solid that is stockpiled on the bowl internal walls, is transported by a scroll and continuously emptied towards the side opposite to the liquid exit. In order to avoid the dehydrated solid accumulation and to guarantee a regular discharge, a specific device (solid scraper) can be

installed in the solid chamber. This device is automatically activated on the base of the parameters set by the operator on the control panel.



Solid conveying system



The solid exiting from the decanter can be discharged by gravity in an underlying container or it can be moved in a lateral one, using an adequate horizontal or inclined scroll conveying system. The main control panel can handle every single component of the system, it automatically activates the start and stop sequences, in relation to the centrifuge effective working conditions. The Pieralisi's decanter unique design allows installing the conveyor directly under the solid exit without any further civil work.



Centrifugal separator

Pieralisi vertical centrifuges represent the perfect technological solution to "Pieralisi Control System" is divided in two main sections: power and complete the separation process done with horizontal decanters. Vertical control. The main switches and the variable frequency drives (VFD) for separators, taking advantage of their extremely high rotational speed, can both decanter, separator and auxiliaries are placed in the power side. reach centrifugal force values up to 10.000 g, far higher than decanters The control module is based on the latest generation PLC and HMI with a can reach. This very high centrifugal force is the key element that allows touch screen panel. A dedicated software, designed by Pieralisi automation the separators to remove the solid particles that have not been grabbed department, is embedded in the PLC to automatically control the whole in the previous separation steps, generating a highly pure clarified liquid. separation plant during each operating phase: start-up, duty, flushing, In addition the attainable performances are linked to many factors, both shutdown and emergency. The HMI allows navigating through several areas: structural (disc type and design, inside volumes, liquid discharge levels • separation process monitoring and devices) and operational (flow rate, characteristic of the product, solid • operating parameters control quantity and type, temperature). • alarms detection and interlocks

Pieralisi centrifugal separators are specifically developed to reach the • main parameters trend display maximum guality levels of the juice by using internal components designed The last control release optimizes the separation performances and stabilizes to remove also the smallest solid particles. The product to be clarified enters the operation conditions by controlling the **decanter centrifuge** in "torque into the top of the separator through the feeding tube, it is undergone mode". The logic is continuously calculating the torgue on the decanter scroll, keeping it stable at its set point value, by smoothly acting on the to centrifugal force and then it is forced to pass through the hundreds of internal discs. The combined action of the centrifugal force together scroll differential speed. The PLC automatically handles and controls the with the presence of the internal discs leads to the separation of the solid centrifugal separator in each operating step (start-up, duty, discharge, particles that are deposited on the bowl wall, where these are discharged flushing and shutdown), monitors the main parameters and effectively in an automatic and intermittent way. The clarified liquid centrally climbs manages any anomaly or emergency. back towards the top of the bowl and it continuously exits through the All Pieralisi control panels can be equipped with a dedicated module suitable centripetal pump. The discharge by means of the centripetal pump permits, for remote connection, supervision, diagnostics and support. Upon request, only the control unit (TCP) can be supplied: this solution as for decanters, to have a pressurized outgoing flow to avoid the air contact and the consequent possible oxidation and to minimize the foam formation. does not consider the possibility to control the auxiliaries and does not have the electrical section with VFD and breakers.

CIP washing system



In the food industry, the requirements of hygiene and cleanliness of the installed in the washing circuit, allows to feed the washing liquid in various pieces of equipment are very restrictive and therefore they are absolutely points, both inside the rotating assembly and in its external part, between unavoidable. Pieralisi centrifuges (both decanters and separators) are bowl and case. The CIP washing procedure, besides being a fundamental provided with a reliable and efficient CIP washing system (Clean in Place), requirement to fulfill the food industry regulation, it represents a primary that is automatically run from the control panel and can be set depending on element in order to preserve the functionality of each single component every single process need. Two specific washing sequences are automatically of the separation unit and to maintain the highest level of reliability and started and handled by the control panel at the end of each operation cycle performance in the course of time. or in case of necessity. A number of dedicated solenoid valves, conveniently







Electrical and control panel

Configuration table



Citrus fruit juice	Essential citrus fruit oils	Apple and pear juice	Peach, apricot, prune, kiwi juice	Berry juice	Mango, guava, papaya, lychee juice	Tomato and carrot juice	Grape juice	Pineapple juice
1	2	3	4	5	6	7	8	9

Decanter centrifuge

	Powd	Shallow cone				
		Inner surface with liners				
	bowi	Inner surface with grooves				
		Wear protection solid discharge bushings (replaceable)				
NUTATING ASSEMIDET		Single flight				
	Scroll	Variable pitch flight				
	Scroll	Flight with windows				
		Flight wear protections: sprayed tungsten carbide				
	Bowl and scroll	SAF 2205 Duplex				
		AISI 316 Stainless steel				
		Stainless steel cylindrical body				
		Stainless steel solid-liquid chambers				
MATERIALS	Case	Stainless and painted carbon steel cylindrical body, internal coating in stainless steel				
		Stainless steel subframe				
		Painted carbon steel subframe				
	Parts in contact with the product	Stainless steel				
	Parts in contact with the product	Tailored on the application and international standards				
EXECUTION	Installation area	Safe area				
	Gearbox	Oil bath (tailored on the FDA specifications)				
LODRICATION	Bearings	Automatic greasing (grease tailored on the FDA specifications) $ ightarrow 03$				
PROCESS	Liquid outlet	Interchangeable liquid outlet levels				
CONFIGURATION		Liquid discharge level adjustable during operation (CPA) $ ightarrow$ 01				
	Bowl drive	Electric motor				
		Fixed differential speed				
DRIVES	Scroll drive	Electric motor (back drive)				
		Hydraulic motor				
		Rotovariator				
	Kits and systems	Control panel				
DECANTER OPTIONS		Counter pressure valve				
		Cooling fan				
		Solids scraper device				
		Cip washing system $ ightarrow 02$				
PLANT OPTIONS	Kits and systems	Filtering unit				
		Solid conveying system				
		Feeding pump				
		How rate measurement kit				
		Heating system				

Centrifugal separator

PROCESS	Liquid discharge	Single outlet under pressure
		Double outlet under pressure
	Solid discharge	Manual
CONFIGURATION		Automatic
	Type of separation discs	Clarifier
		Concentrator
	Bowl	SAF 2205 Duplex
	Cover	Stainless steel
MATEDIALC	Framo	Cast iron with stainless steel inner protection
IVIAI ENIALS	riallie	Stainless steel > 04
	Watparts	Stainless steel
	wet parts	Tailored on the application and international standards
DROTECTION	Gaskets	High wear and corrosion resistant
PROTECTION	Seal	With wear and corrosion special protection system
	Туре	Gears
		Belts
INANSIVIISSIUN	Lubrication	Oil bath (tailored on the FDA specifications)
		Oil with forced circulation cooling system
EXECUTION	Installation area	Safe area
	Туре	Stand alone separator with vibration absorber and anchor device
INSTALLATION		Separator on stainless steel base
		Stainless steel skid equipped with control panel and auxiliary units
	Kits and Systems	Control panel
SEPARATOR OPTIONS		Manual activation of the solid discharge
		Automatic activation of the solid discharge
		Cip washing system
PLANT OPTIONS		Filtering unit
	Kits and Systems	Constant level feeding system
		Feeding pump
		Flow rate measurement kit





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