

Food Processing Machinery

PIGO FOOD PROCESSING TECHNOLOGIES

*One of the **world's leading freezing, freeze drying and drying equipment manufacturers** and **fruit and vegetable processing equipment suppliers***



Our extensive experience in processing technologies and diversified product portfolio allow us to successfully serve our global customer base

PIGO VISION

You don't need to be the biggest to do things better. You only need the will to do it. And to know how.



knowledge	***cooperation***	***continuous development***
precision	***commitment***	***innovative research***
excellence	***reliability***	***constant improvement***

MAIN PRODUCTS

1 Freezing

EASY Freeze



- Fluidized bed freezer
- Most suitable for IQF of a variety of fruits, vegetables and numerous sea, meat and cheese products

EASY Freeze Spyro



- Spiral freezer
- The most suitable solution for freezing doughy products, meat and fish, pizza, etc.

2 Freeze drying

EASY Freeze Dryer



- The most advanced dehydration technology
- Saves all nutritional values producing a premium quality product

3 Drying

EASY Dry PG 135



- Food drying by using the right combination of proper temperatures, low humidity and controlled air flow

4 Fruit and vegetable processing

Fruit processing



- Complete lines for fruit processing
- Global product leadership for destoning machinery

Vegetable processing



- Complete lines for vegetable processing

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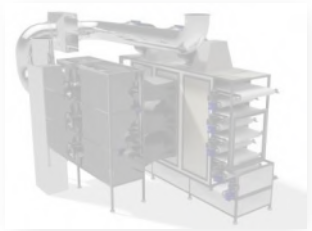
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1 FREEZING

Process

- Freezing is generally regarded as **superior to canning** with respect to retention in sensory attributes and nutritive properties
- **Increasing importance since it provides raw materials for other advanced technologies such as freeze drying (lyophilization – sublimation drying) as well as conventional drying**
- The process involves **lowering the product temperature** generally to **-18 °C or below**
- The extremely low temperature simply **retards the growth of microorganisms** and **slows down the chemical changes** that affect quality or cause food to spoil

Technologies

- **BLAST FREEZING** – obsolete technology that requires much longer freezing time, thus damaging cells structure.
- **INDIVIDUAL QUICK FREEZING (IQF)** – freezing method suitable for **individual quick freezing** of fruits and vegetables based on **fluidization**
- **SPIRAL FREEZING** – suitable for freezing heavy products like fish & meat products, bakery and doughy products, packed food, etc.

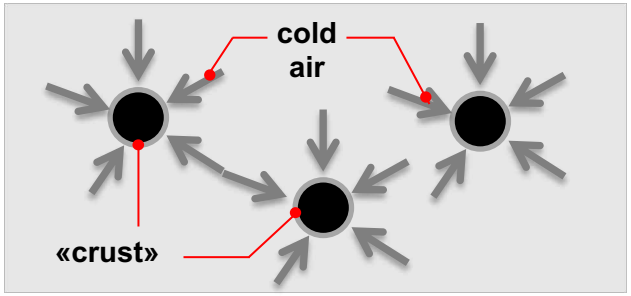
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IQF (INDIVIDUAL QUICK FREEZING)

In **IQF freezing fluidization principle** allows to **individually freeze** every fruit / vegetable piece in a very **short time**, **without any risk** of squeezing or **damaging the product** (no mechanical agitation or contact)

Thanks to the controlled powerful vertical air stream from under the belt (usual air temperature from -32 to -35 ^{0}C):

- Every particle is held in air, **without touching the belt or other pieces** during the process
- Air surrounds individual fruit / vegetable pieces from all sides creating a quick surface **"crust" freezing**





Good IQF freezing provides **100% individually frozen product** without lumps and blocks

FLUIDIZATION PRINCIPLE

IQF Freezing is based on fluidization:

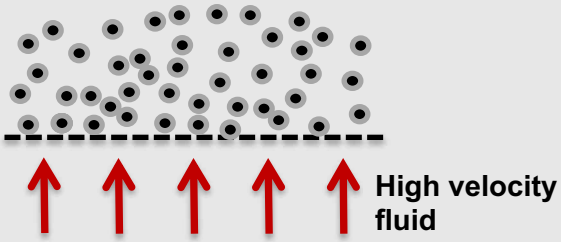
Fluidization *is a* ***process whereby a granular material*** *(i.e. pieces of fruit or vegetables) is* ***converted*** *from a* ***static solid-like state*** *to a* ***dynamic fluid-like state***

This process occurs when a **fluid** (i.e.**air**) is passed up through the granular material:

STATIC solid-like state



DYNAMIC fluid-like state



- When a gas flow is introduced through the bottom of a bed of solid particles, it will move upwards through the bed via the empty spaces between the particles
- In case of extremely high gas velocity, upward drag forces will exactly equal the downward gravitational forces, causing the particles to become suspended within the fluid
- At this critical value, the bed is said to be fluidized and will exhibit fluidic behavior

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Fluidized bed IQF deep freezing tunnel

Unique *EASY Freeze* freezing technology by PIGO



EASY FREEZE CHARACTERISTICS

Efficient fluctuation freezing conditions		Extraordinary **freezing efficiency** with almost instant crust freezing provides **no weight loss or product evaporation**, keeping **intact the product integrity**
Inverters (frequency converters)		Maximum **flexibility** in adjustment **of fan speed** and **working conditions** in the freezer, **to any specific technology and product**
Freezer design		**Easy access** to all freezer parts, allowing easy replacement in case of **maintenance** and **cleaning operations**
Internal video surveillance system		Equipped with internal video monitoring system with special cameras working at -40 °C conditions, providing possibility to **control complete process in the freezer from outside or in remote**
In-feed vibrating dewatering conveyor		Extremely efficient **product dewatering** before entering the freezer and **perfect product distribution** over the entire product flow width
Air Snow Removal System (ASR)		**Efficient air snow removal** keeps the evaporator **free of snow and frost** (deriving from free water on product surface) during the entire desired working time

EASY FREEZE SPYRO

Continuous Deep Freezing Spiral Tunnel

The most efficient and economic solution for freezing of fish, meat, ready meals, packed food, etc.



EASY FREEZE SPYRO CHARACTERISTICS

EASY Freeze SPYRO, the **latest generation spiral freezer**, gives utmost advantages to the users, both in **energy efficiency** and in **hygienic and technological advantages**, such as:

Gear motors outside the cabin



No lubrication inside the freezer, **avoiding any risk of contamination** due to oil leakages

No mezzanine floors / platforms

Avoiding any dirtiness accumulation, satisfying the absolutely highest hygienic standards

Quickest freezing process



High speed circulation of cold air in contact with the product, on the entire length of the spiral conveyor

Very low weight loss

Two times **less weight loss** then with vertical air flow (high air speed and full length product contact with air)

Hitting the product with the coldest air



No lateral openings on the drum

Airflow guidance



Snow reduction freezing process



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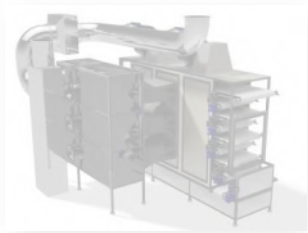
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2 FREEZE DRYING (LYOPHILIZATION)

Freeze drying is the **drying of a frozen product under vacuum** producing a premium quality product which **retains most of its original shape, colour, taste and nutrients**, as well as lightweight for easy handling and transportation.

The ice contained in the product is sublimated, hence transformed from solid to gas and then trapped inside the condensation system:

- The water is only present in two phases: ice and vapour
- The vacuum allows the **ice to turn directly into vapour without passing through the water stage,** in a sublimation process



- Freeze drying is applied to dry a **vast number of food products like fruit / berries / vegetables, meat / seafood, soup blocks, rice dishes, yoghurt, ice-cream**, etc.
- The sensorial properties of the finished product are absolutely superimposable to those of the fresh product

EASY Freeze Dryer (or Lyophilizer)

Unique PIGO design and technology



EASY FREEZE DRYER CHARACTERISTICS

Efficient heating system	**More efficient vapour transfer** from the product to the evaporator – ice capture
Doubled inside condenser – evaporator	**More efficient ice capture** and **shorter freeze drying time**
Low volume heating fluid system	**Short start-up time** and quick process start
Short distance between fruit and evaporator	Facilitated drying process and ice capture, leading to **shorter drying time**
Shallow product plates and increased product plates surface	**Fruit temperature preservation** during vacuuming processing
Unique multiple vacuum system	**Multiple vacuum suction openings** all along vessels length are **stimulating vapors extraction and sublimation**

FASTER DRYING WITH LESS ENERGY (reduced drying time by up to 15-25% - total drying time of 8-16 hrs - while consuming less energy)

LOW TEMPERATURE OPERATION (uniquely designed features allow for low temperature operation cycles which are crucially important for preserving the natural integrity of your product)

FOOD SAFETY FRIENDLY (the only design with fully accessible and cleanable machine interior)

OPERATOR FRIENDLY (all steps in the drying process are designed to facilitate simple, fast and efficient operation and maintenance)

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3 DRYING

Food drying is one of the oldest methods of preserving food for later use: **drying removes moisture from the food,** which therefore becomes smaller and lighter in weight.



Food is dried by using the right combination of proper temperatures, low humidity and controlled air flow

- **Proper temperatures** cause the moisture to evaporate
- **Low humidity** of the air flow allows moisture to move quickly from the food to the air
- **Air flow** speeds up drying by moving the surrounding moist air away from the food









Multistage Belt Dryer with Adiabatic option

with continuous return air condensing drying and individual zone drying control



EASY DRY PG 135 CHARACTERISTICS

Continuously dried air	Providing the most efficient product drying and the best drying effect
Multi stage drying	The number of heat exchangers determines the number of drying zones, each of which can have different settings (e.g. temperature) according to product characteristics and requirements
Powerful fans	Hot air is blown trough the product by powerful fans in predetermined multiple points, providing optimal air flow distribution and uniform drying
Indirect heating	Indirect heating is carried out by using steam, thermal oil or waste heat from an existing plant
Condenser unit with returned air flow	The condenser unit installed on the returned air flow guarantees the continuous work with only recirculated air, what is particularly important in drying of easily oxidable products
COP system	Cleaning On Place system, consisting of piping with sprayers and water collecting basin, provides efficient washing or necessary areas after working cycle

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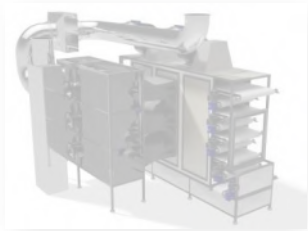
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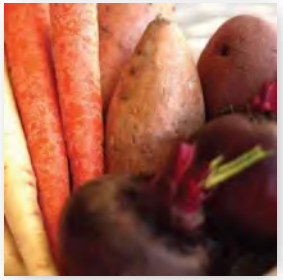
*The most **convenient energy saving** and **user friendly** processing solutions, **tailored for your needs**.*

















STONE FRUIT PROCESSING

General flow chart for stone fruit processing:

- Washing
  PG 001
- Destemmer
  PG 138
- Inspection conveyor belt
  PG 025 i
- Calibrator
  PG 062
- Conveyor belt for calibrator
  PG 025 K
- Elevator
  PG 033 D
- Distribution conveyor
  PG 025 D
- Pitting machine
  PG 103
- Collecting conveyor belt
  PG 025
- Elevator
  PG 033
- Continuous deep freezing tunnel
  Easy freeze

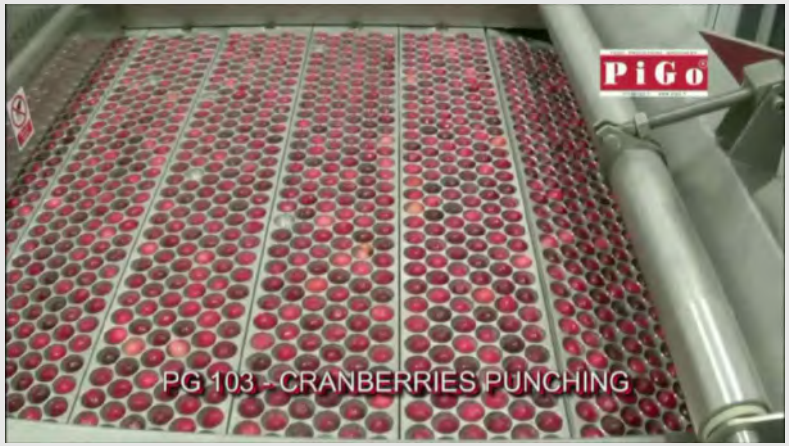


Example of a stone fruit processing line installed by PIGO

FRUIT PROCESSING PRODUCT PORTFOLIO (1/3)

Pitting machine PG 103





Pitting machine PG 104



Calibrator PG 62



FRUIT PROCESSING PRODUCT PORTFOLIO (2/3)

Destemmer PG 138



Drum destoner PG 105



Sorter PG 061 P



Washing machine PG 001



FRUIT PROCESSING PRODUCT PORTFOLIO (3/3)

Inspection belt PG 025 i



Elevator PG 033



Vertical pulper PG 250



Horizontal pulper PG 251

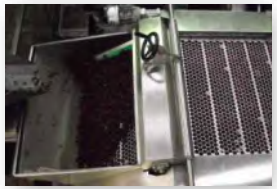


PITTING MACHINE PG 103

High capacity automatic pitting machine PG 103



PITTING MACHINE PG 103 CHARACTERISTICS

Fruit distribution system		Excellent machine feeding **provides completely filled plates** even with low level of product in the in-feed hopper, thus **preventing squeezing and destroying of fruit**
Specially constructed chain		**Long and reliable working life**
Movement of rubber washers' holding plate		Rubber washers are in contact with plates only during pitting operation (when plates are still), thus providing a **minimum wearing of rubber washers** - no brakes are necessary for their replacement during the season
Pneumatic ejecting system		**100% effective detaching of adhering fruit** without any mechanically moving parts
High capacity		Thanks to special distribution system and extremely large size of plates, our machine has at least **50-100%** (or up to 5-7 times) **higher capacity than any other machine on the market**

Extremely low percentage of remained stones in pitted cherries:

- Experience of all our clients confirms **0,00% of remained stones** when adequate quality and preparation of the fruit (clean, calibrated product with adequate ripeness) is provided
- Guaranteed max 0.02-0.05%

CALIBRATOR PG 062

High capacity multisection calibrator with variable rolls distance PG 062



CALIBRATOR PG 062 CHARACTERISTICS

Used for **sorting fruit or vegetable products according to their size**, in a very wide calibration range.

Adequately dimensioned in-feed hopper and special brush



Surplus levels of product on the calibration rolls are removed, thus leaving **always only one level** (or row) **of the product on calibration rolls** - the first condition for a perfect calibration

Built-in system of free falling rolls



Continuous and independent **adjustment of sorting size in each calibration section** separately and independently

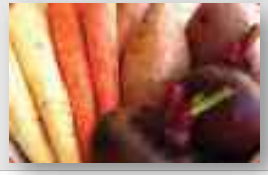
Forced rotation of calibration rolls



Each single product particle is brought into **the perfect position for calibration** (impossible to provide with any other sorting system or machine)

Products (fruit or vegetables) are **treated in the most delicate way**, without **any product maltreatment** and with provided **perfect calibration** for each product particle during its way through the machine

VEGETABLE PROCESSING SOLUTIONS

Product		Basic technological operations
Green peas		Acceptance, Pods Separator, Air Separator, Washing (Flotation, Rotation), Gradeing, Blanching, Cooling, Inspection, Dewatering, Freezing
Green beans		Acceptance, Air Separator, Stone removal, Washing, Pods Separator, Declustering, Green Beans Snipper, Cutting, Blanching, Dewatering, Freezing
Root vegetables		Acceptance, Soil Removal, Stone Removal, Washing, Pealing, Polishing, Cutting, Blanching, Cooling, Dewatering, Freezing
French fries		Acceptance, Soil & Stone removal, Washing, Pealing, Sorting, Cutting, Blanching, Drying, Equilibratio, Frying, Defatting, Freezing
Artichokes		Peeling, Grading, Cutting, Washing, Blanching, Cooling, Sorting, Dewatering, Freezing
Leaf vegetables		Acceptance, Insects separation, Visual/Optical sorting, Stone separation, Washing, Blanching, Cooling, Dewatering, Forming, Freezing

Some of the PIGO machines

Pealing



Blanching & Cooling



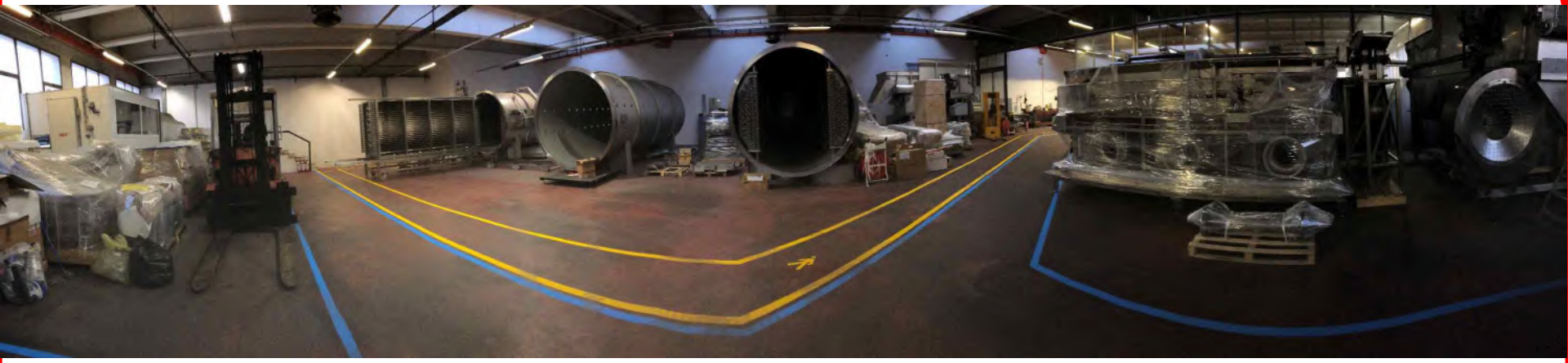


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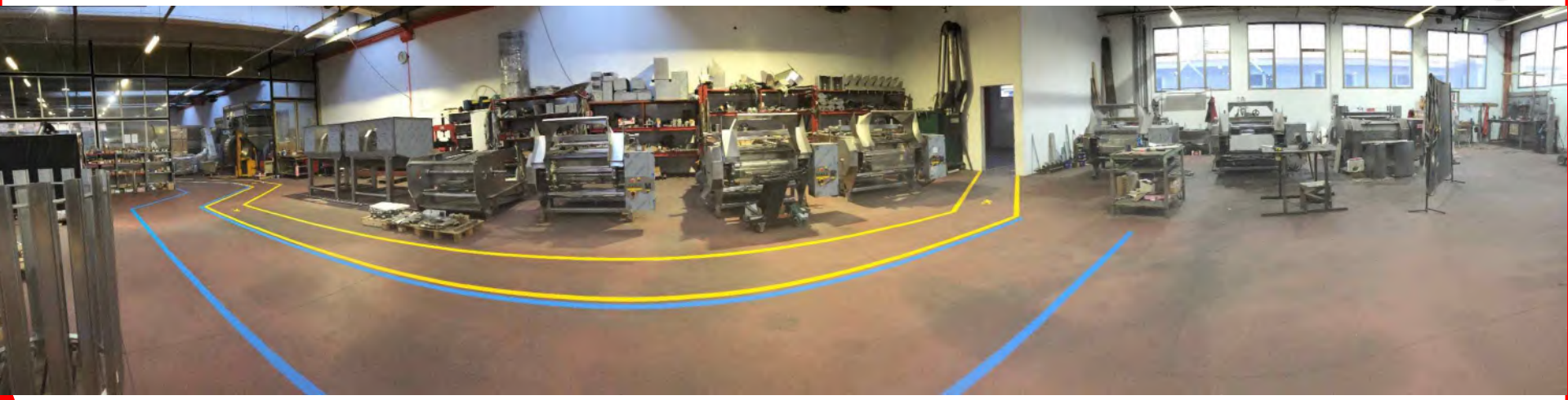
Our philosophy is simple: ***give the best to those who expect only the best***

(D.Z.)

For major information please visit **www.pigo.it**
or e-mail us to info@pigo.it



You are welcome to visit our factories in Italy



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