



Food Processing Machinery

## CV – GORAN OBRADOVIC



- Currently **CEO** at **PIGO**
- **Founded PIGO** in 1991
- Entered **food processing** and **freezing industry** in 1986 in Yugoslavia

***Strong knowledge of freezing technology and deep insight in machines design***

# PIGO FOOD PROCESSING AND FREEZING TECHNOLOGIES

*One of the world's leading freezing equipment manufacturers and fruit and vegetable processing equipment suppliers with an extensive experience in both freezing and fruit and vegetable processing*



Together with its partners, PIGO has installed its machines throughout the world (i.e. customers from US, Europe, Africa, Australia and Asia)

## 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*

*devotion*

*excellence*

*constant improvement*

# MAIN PRODUCTS

## 1 Freezing

### Easy Freeze



- fluidised bed freezer
- the most suitable for IQF freezing 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 Fruit and vegetable processing

### Fruit processing



- complete lines for fruit processing
- global product leadership for destoning machinery

### Vegetable processing



- complete lines for vegetable processing

# 1 FREEZING

## Process

- Freezing is generally regarded as **superior to canning and dehydration**, with respect to retention in sensory attributes and nutritive properties
- 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

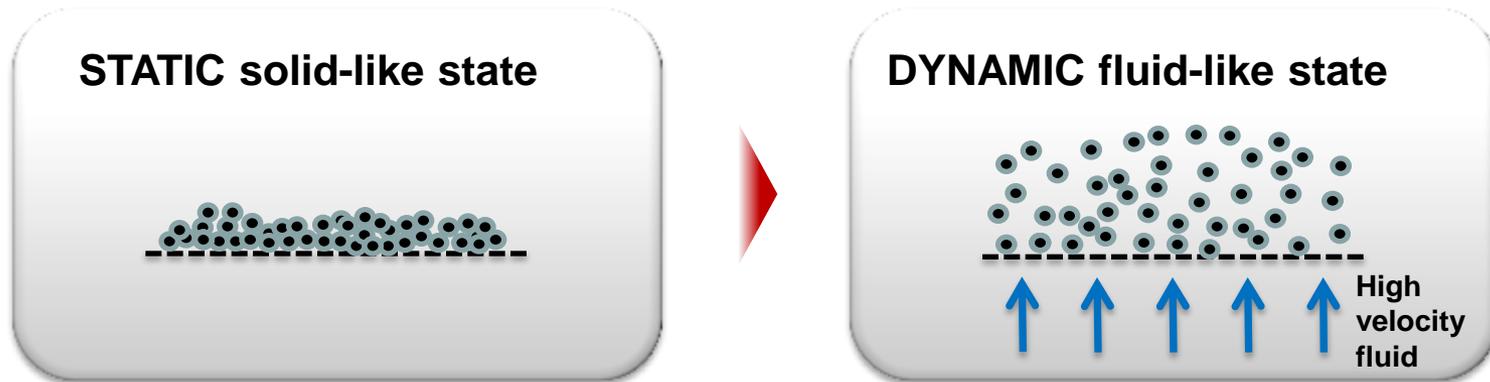
- **BLAST FREEZING** – obsolete technology that requires much longer freezing time, thus damaging cells structure.
- **INDIVIDUAL QUICK FREEZING (IQF)** – freezing method suitable for **individual quick freezing** of fruits and vegetables based on **fluidization**
- **SPIRAL FREEZING** – suitable for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

# 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:



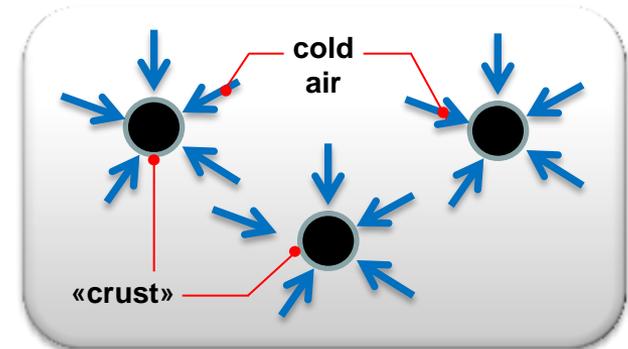
- When a gas flow is introduced through the bottom of a bed of solid particles, it will move upwards through the bed via the empty spaces between the particles
- In case of extremely high gas velocity, upward drag forces will exactly equal the downward gravitational forces, causing the particles to become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

# FLUIDIZATION IN IQF 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 (air temperature from  $-32$  to  $-35$  °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

# EASY FREEZE

Fluidized bed IQF deep freezing tunnel

Unique *EASY Freeze* freezing technology by PIGO



# EASY FREEZE CHARACTERISTICS

**Efficient fluctuation freezing conditions**



▶ extraordinary **freezing efficiency** even if product flow exceeds 100% of declared capacity, thanks to the generous design and dimensioning

**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**

**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 during the entire desired working time

## 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**

**Hitting the product with the coldest air**

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

**No lateral openings on the drum**

product is immediately **“crusted”** and **snow formation diminished**

**Airflow guidance**



**improving the air guidance** and **minimizing** the possibility to **accumulate dirtiness**

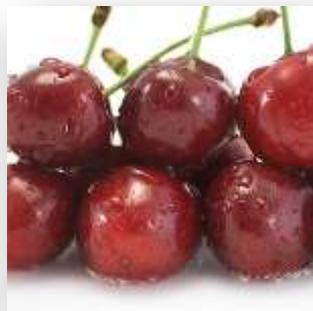
**Snow reduction freezing process**

lateral aprons guide the airflow on the opposite side of the evaporators allowing **easy access** all around

low temperature increase of air passing through the product-**less air humidity content increase**

## 2 FRUIT & VEGETABLE PROCESSING

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

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 machines **PG 103** and **PG 104**



Calibrator **PG 062**



# FRUIT PROCESSING PRODUCT PORTFOLIO (2/3)

Washing machine **PG 001**



Destalking machine **PG 138**



Sorter **PG 061**



Conveyer belt **PG 025**



# 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



extremely **long working life** and **reliable work**

## Mechanism for 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% 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 0,05%

## 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	Some of the PIGO machines
<p><b>Green peas</b></p> 	<p>Acceptance, Pods Separator, Air Separator, Washing (Flotation, Rotation), Grading, Blanching, Cooling, Inspection, Dewatering, Freezing</p>	<p><b>Peeling</b></p> 
<p><b>Green beans</b></p> 	<p>Acceptance, Air Separator, Stone removal, Washing, Pods Separator, Declustering, Green Beans Snipper, Cutting, Blanching, Dewatering, Freezing</p>	<p><b>Blanching &amp; Cooling</b></p> 
<p><b>Root vegetables</b></p> 	<p>Acceptance, Soil Removal, Stone Removal, Washing, Peeling, Polishing, Cutting, Blanching, Cooling, Dewatering, Freezing</p>	
<p><b>French fries</b></p> 	<p>Acceptance, Soil &amp; Stone removal, Washing, Peeling, Sorting, Cutting, Blanching, Drying, Equilibratio, Frying, Defatting, Freezing</p>	
<p><b>Artichokes</b></p> 	<p>Peeling, Grading, Cutting, Washing, Blanching, Cooling, Sorting, Dewatering, Freezing</p>	
<p><b>Leaf vegetables</b></p> 	<p>Acceptance, Insects separation, Visual/Optical sorting, Stone separation, Washing, Blanching, Cooling, Dewatering, Forming, Freezing</p>	



## Food Processing Machinery

For major information please visit [www.pigo.it](http://www.pigo.it)  
or e-mail us to [office@pigo.biz](mailto:office@pigo.biz)