

The COLINES logo consists of the word "COLINES" in a bold, white, sans-serif font, enclosed within a dark blue rectangular border. The background of the entire slide is a dark blue, textured pattern of interconnected hexagonal cells, each containing a small, circular, radial pattern, resembling a honeycomb or alveolar structure.

**COLINES®**

Francesco Peccetti  
Sales Area Manager

# Bubble Guard® technology multi-purpose alveolar sheet



# Bubble Guard®

Multi-purpose  
alveolar sheet

- Concept
- Technology
- Process flow
- Machine range
- Conversion



## What is Bubble Guard® Board?

Concept In-brief

**Patented process** (PCT WO 2005105436; US 8,070,900B2) for the production of a Polypropylene-based multi-purpose alveolar board.

**The core of the technology** stands into the core of our board, being completely alveolar, whilst outer layers show incredible flatness and smoothness.

**Alveolar matrix** increases stiffness as well reduces weight.

*Top 3 features of Bubble Guard® technology:*

- *100% Recyclable*
- *Lightweight*
- *Stiff & strong*



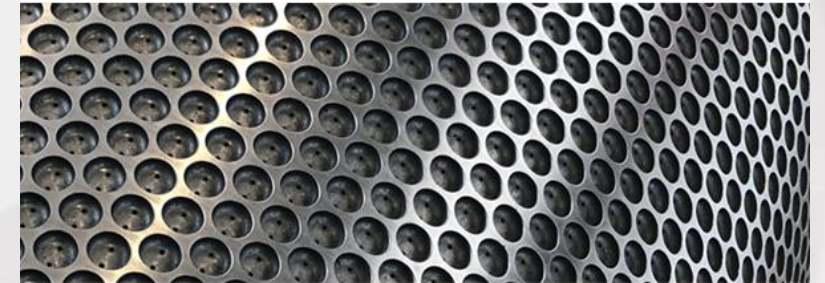
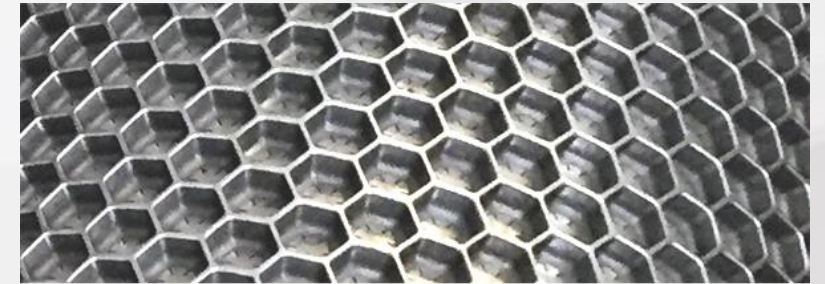
## Alveolar core layer

Endless possibilities

The technology allows to equip the line with several different alveolar matrix, thus matching **specific market requirements**.

- Hexagonal/honeycomb
- Bubble
- Conical
- Linear
- Etc.

**Each of these** available in different matrix and size thus permitting outstanding ranging parameters in one machine only. (200 ÷ 6000 gsm)





## Bubble Guard® Board

facts & figures

**Web width:** up to 2200 mm

**Extrusion dies:** up to 5 units

**Extruders:** up to 8 units

**Min. gsm:** 200

**Min. thickness:** 1.3 mm

**Max gsm:** 6000

**Max thickness:** 30 mm

**Lamination with outer/inner fabrics or films:**  
up to 4 units with double shaft

**Thermoforming calenders:** 1 or 2

**Thermoforming cylinder matrix:** Negative,  
Positive, Positive/Negative



## Bubble Guard® Board

single wall or double wall technology?

**Board composition** plus top and bottom laminates:

Single-wall: up to 11-layer (3 dies)

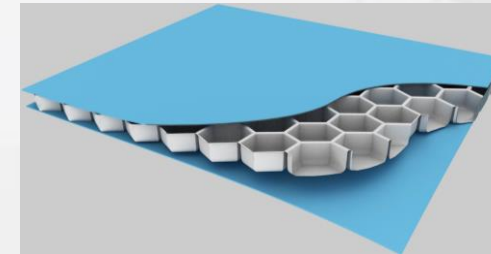
Lam-**ABA-CDC-EFE**-Lam

Double-wall: up to 15-layer (4 dies)

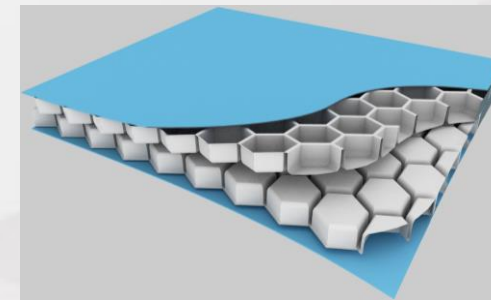
Lam-**ABA-CDC-Lam-CDC-EFE**-Lam

Double-wall: up to 17-layer (5 dies)

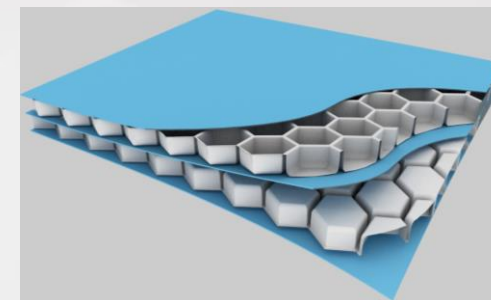
Lam-**ABA-CDC-EFE(/Lam)-CDC-GHG**-Lam



Single-wall  
3 extrusion dies  
1.3 - 12 mm



Double-wall  
4 extrusion dies  
1.3 - 30 mm



Double-wall  
5 extrusion dies  
1.3 - 30 mm

## Bubble Guard® Board

feature > function > benefit!

### Core/thermoformed layer(s):

- flexural rigidity of the panel
- structural load
- determine thickness and density

### Outer skins:

- flat surface
- load distribution
- aesthetic finish
- skid/grip features

Top view



Insight view



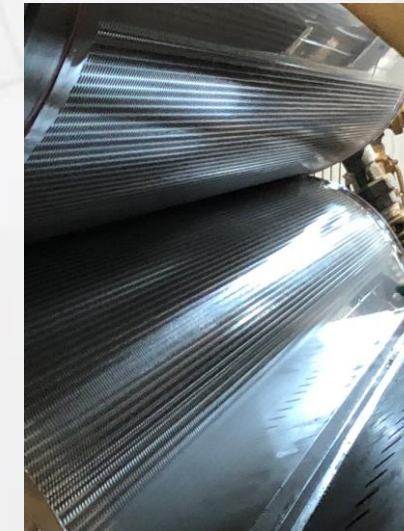
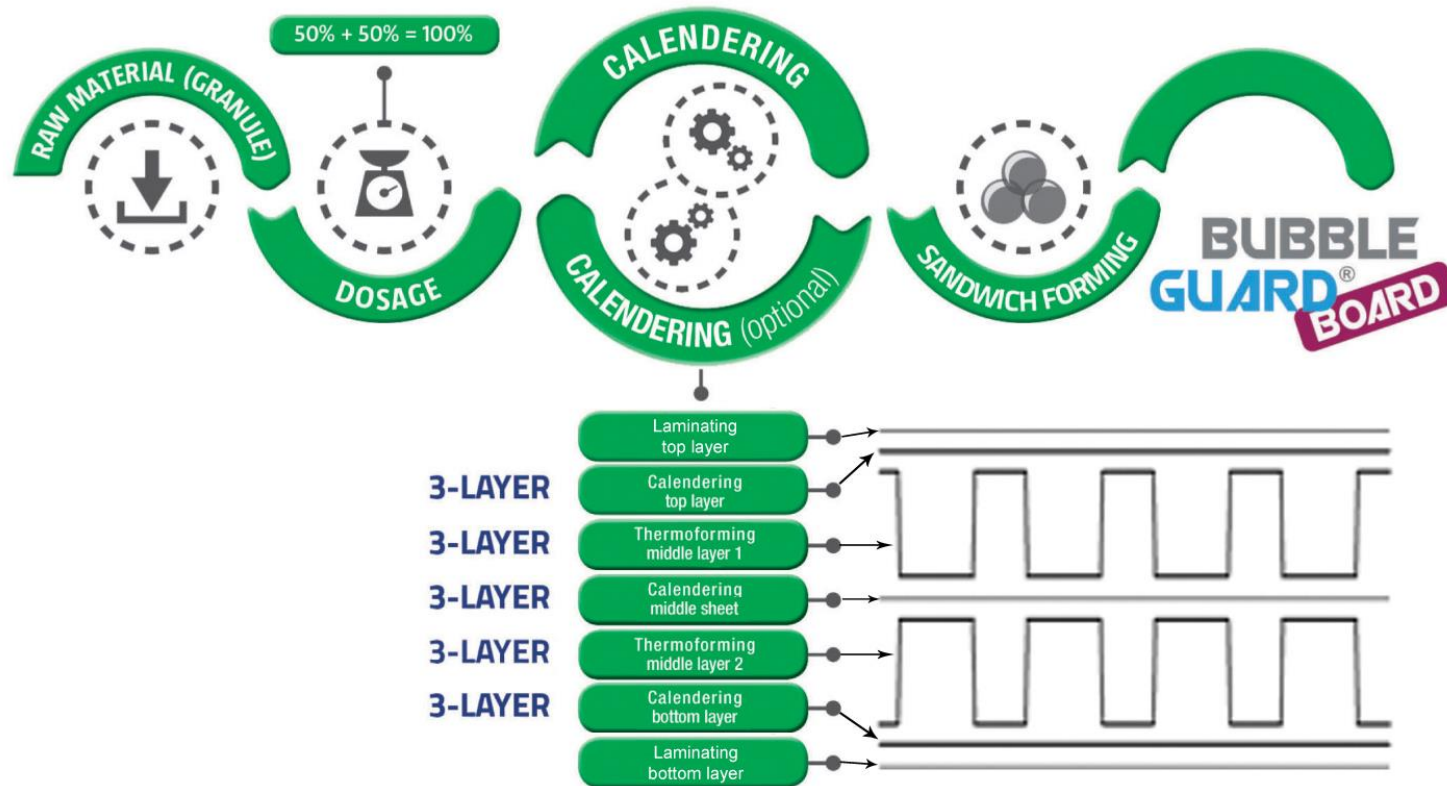
Side view





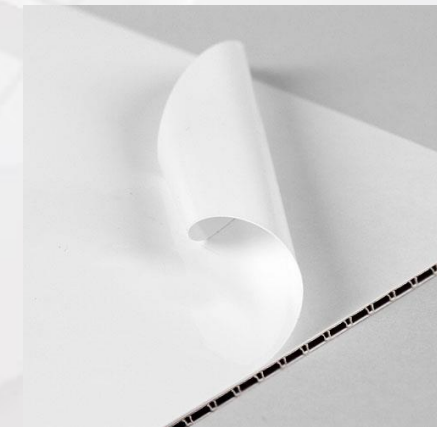
# Bubble Guard® Board

coextrusion in multiple layers



## In-line extrusion and thermoforming

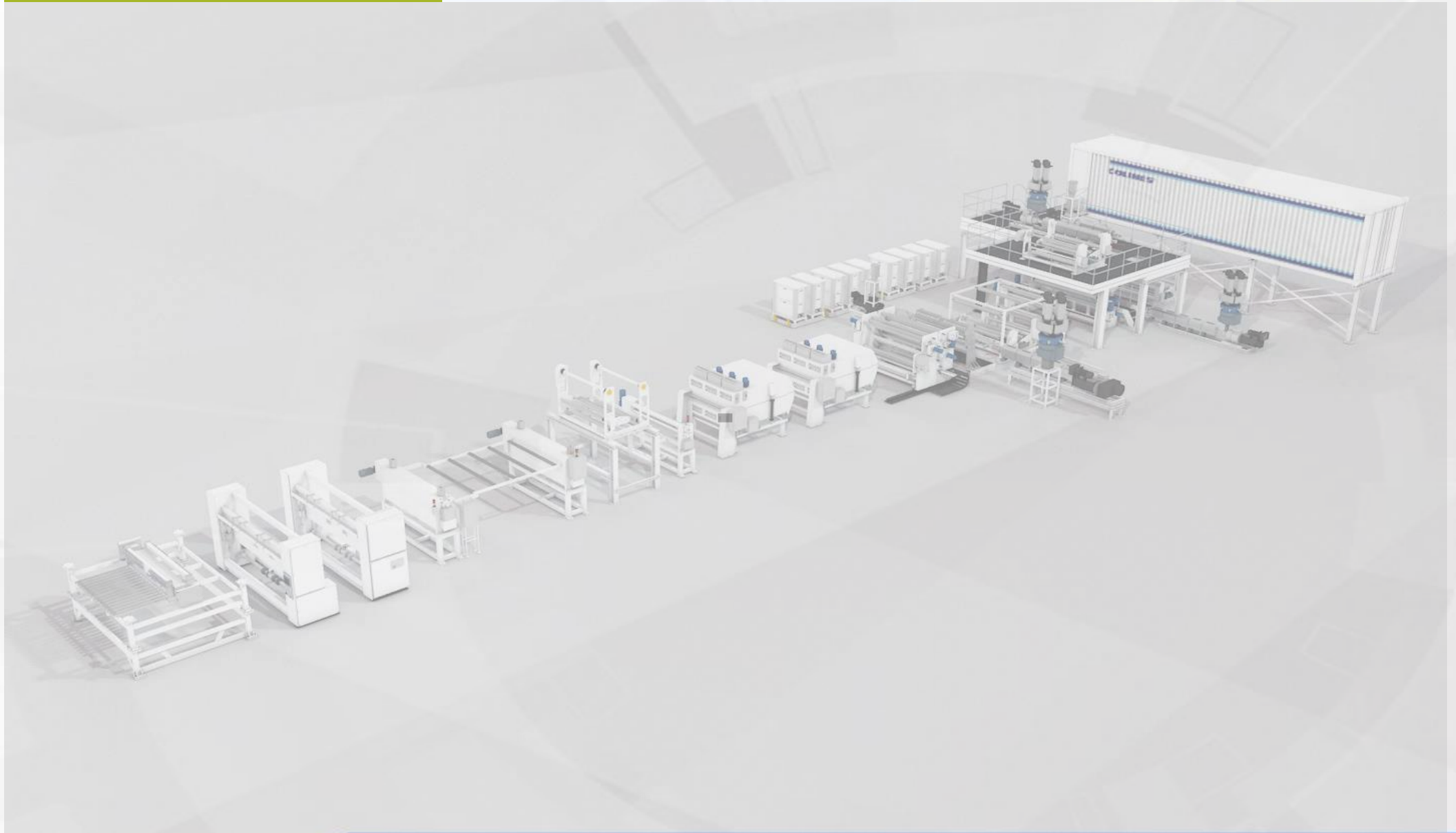
- Flat sheet coextrusion
- Alveolar by means of vacuum forming
- No folding/welding process



## In-line heat lamination

- Non-woven PP
- EPP
- Spunbonded
- Needle punched
- Alkor
- TPO





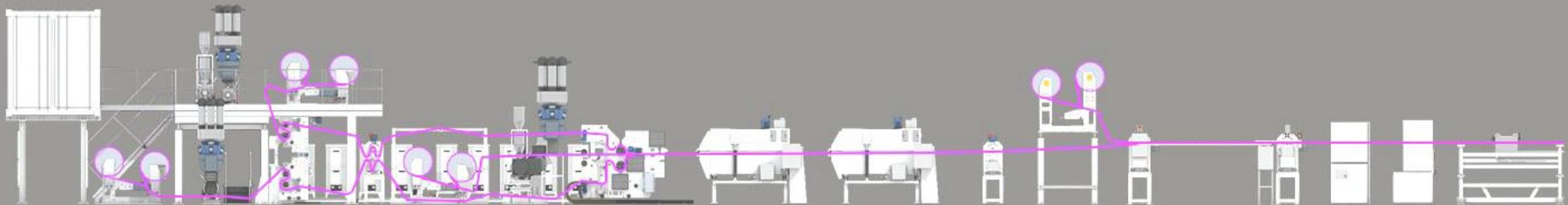
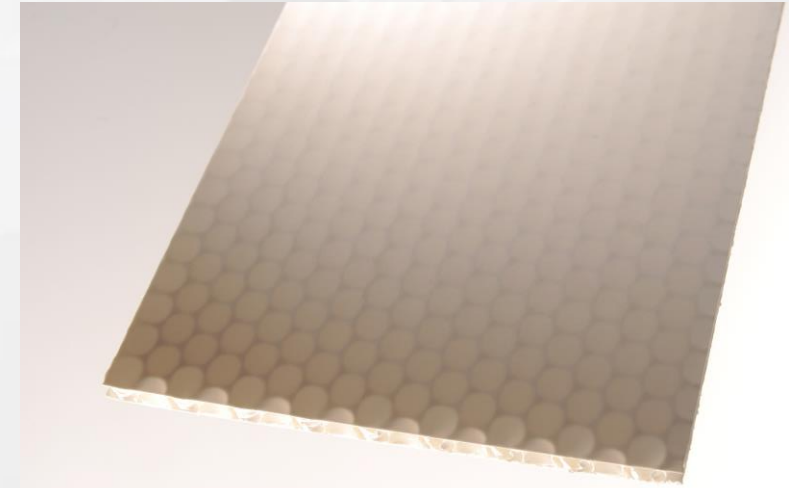
# Bubble Guard® Board

process flow



From raw material

to finished alveolar panel



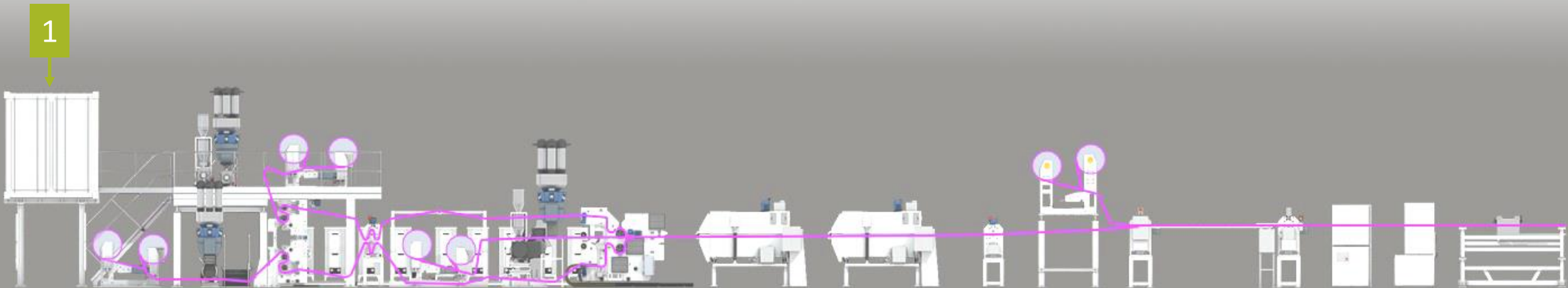


## Bubble Guard® Board

process flow

E-container

Fully equipped 40" container granting dust-proof and heat-proof features.  
Fast installation through plug-and-play cables to the various units.  
Rapid servicing and maintenance through Live Check virtual room on main HMI.



## Bubble Guard® Board

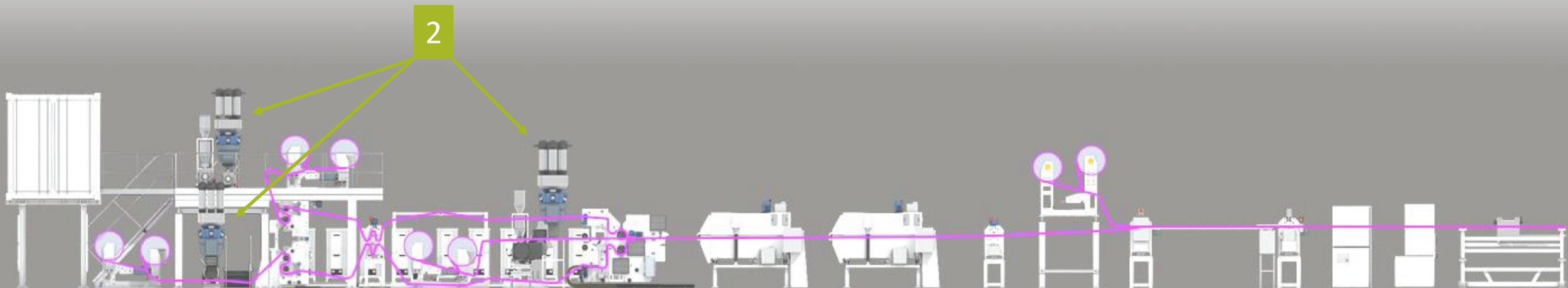
process flow

Dosing

Modular dosing up to 6 components on each extruder.

Ensuring maximum flexibility of the operation with complete traceability on HMI.

Material feeding: Granules (standard) ; Fluff (with silo system) ; Powder (with twin-screw extruder)



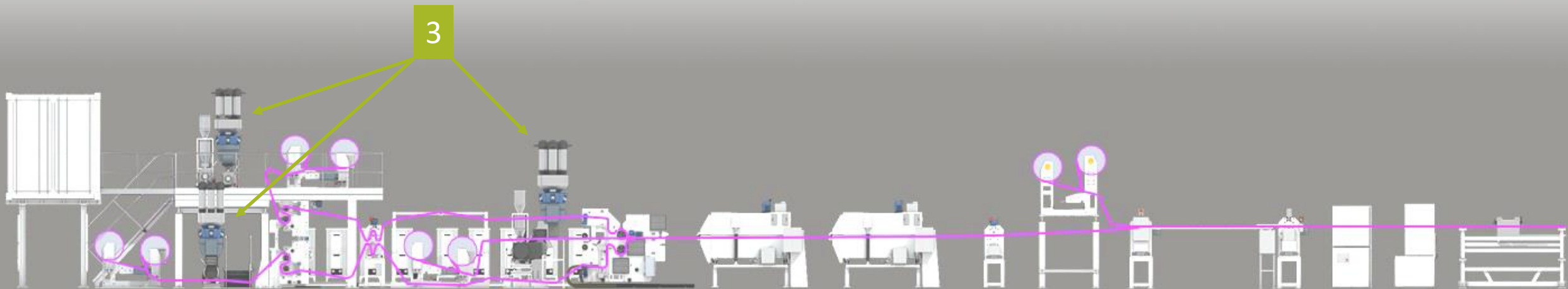


## Bubble Guard® Board

process flow

Processing

Single or double-screw extruders with iR heating system (-25% of energy consumption)  
New design barrier screws allows easy extrusion and high output of Polypropylene resins.

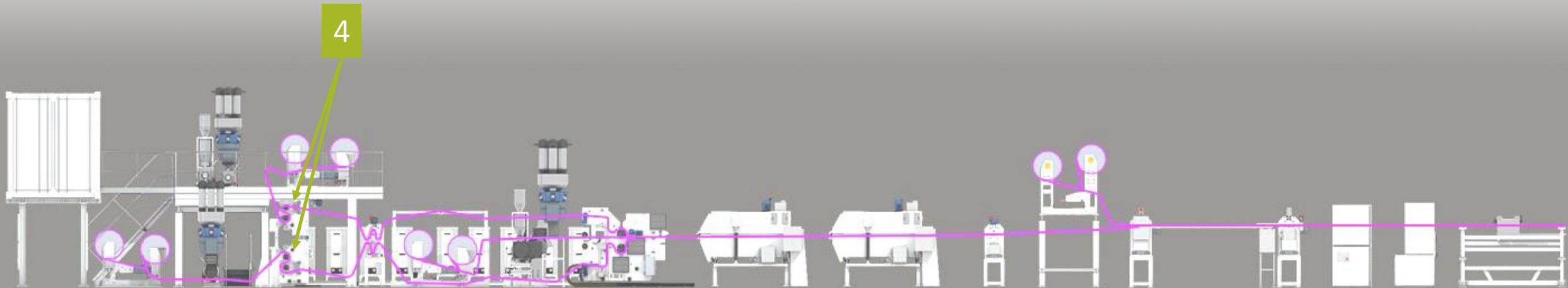


## Bubble Guard® Board

process flow

Finishing

Cooling/embossing units for outer skin layflats formation and finishing.  
Possibility to vary the material surface impression by means of interchangeable cylinders.  
Different cylinders available (printing, concrete like, embossed, etc.)



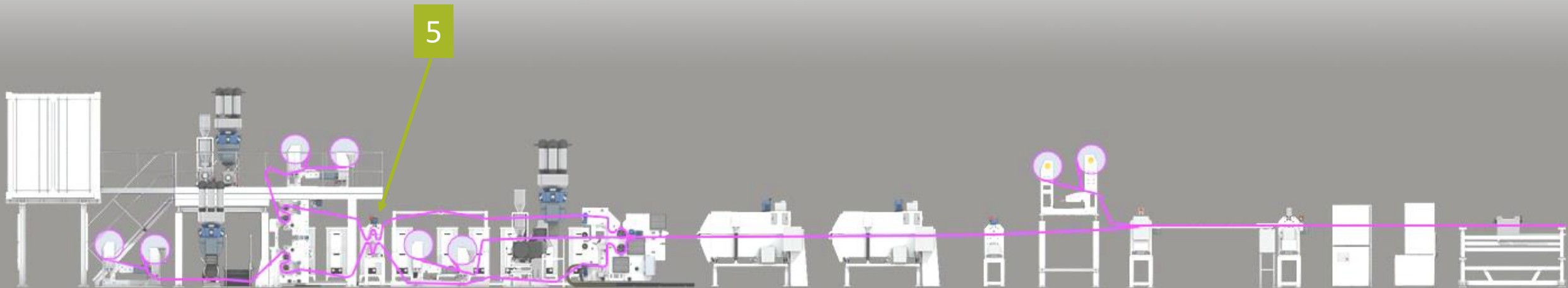


## Bubble Guard® Board

process flow

Treating

Corona unit/s for single or double treatment on outer skins of the board.  
Useful for material surface ink adhesion, needed for the printing process.

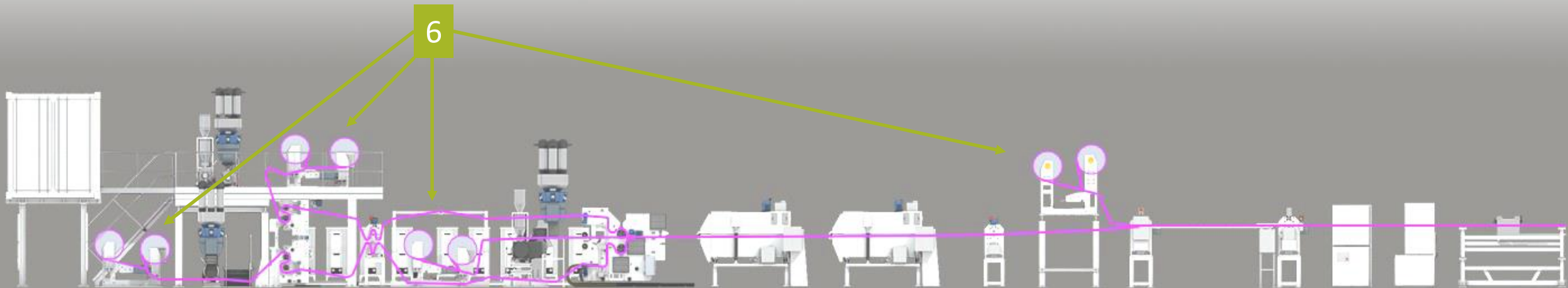


## Bubble Guard® Board

process flow

### Unwinding

Unwinding units for outer skins of the board and the central layflat.  
Additional unit for masking/protection films.  
Double-shafted units for no-stop operation.

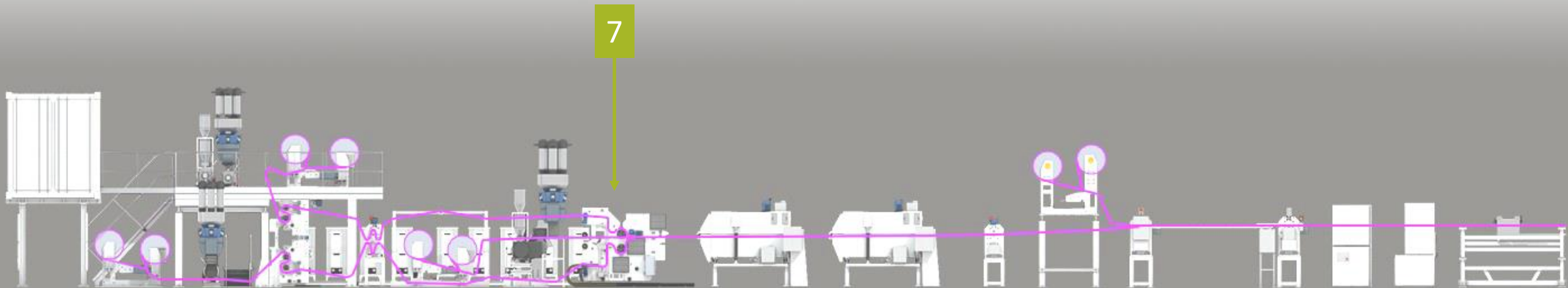


## Bubble Guard® Board

process flow

Forming

Sandwich panel formation through heating process (no glue).  
Lamination of coextruded layflats coming from all the units.



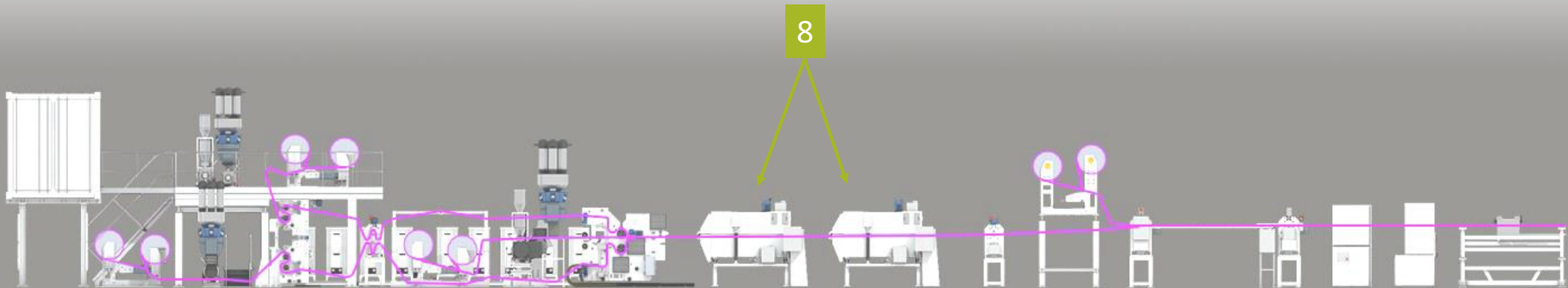


## Bubble Guard® Board

process flow

Stabilizing

Annealing and cooling tunnels for material stabilization.  
No.9 separated zones in each tunnel with individual control.

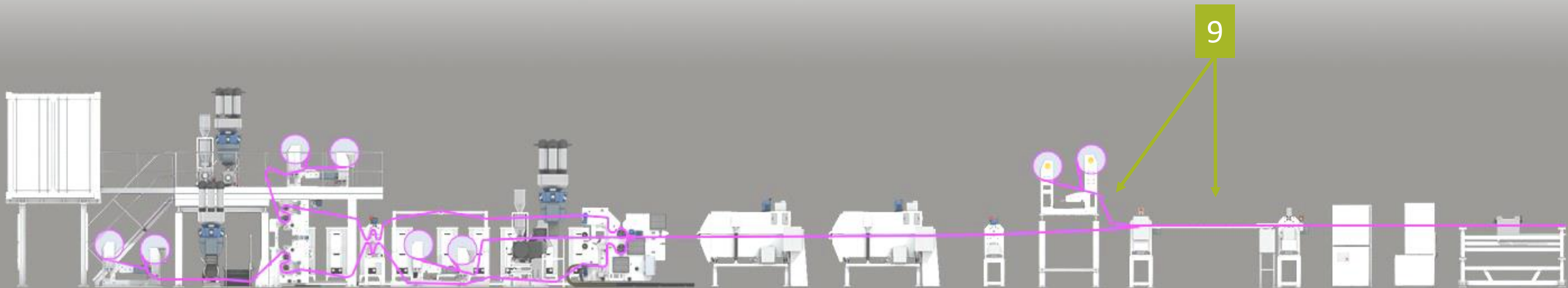


# Bubble Guard® Board

process flow

Recycling

Trimming and recycling systems. Zero-scrap loop thanks to the proprietary re-feeding unit connected with the extrusion section.

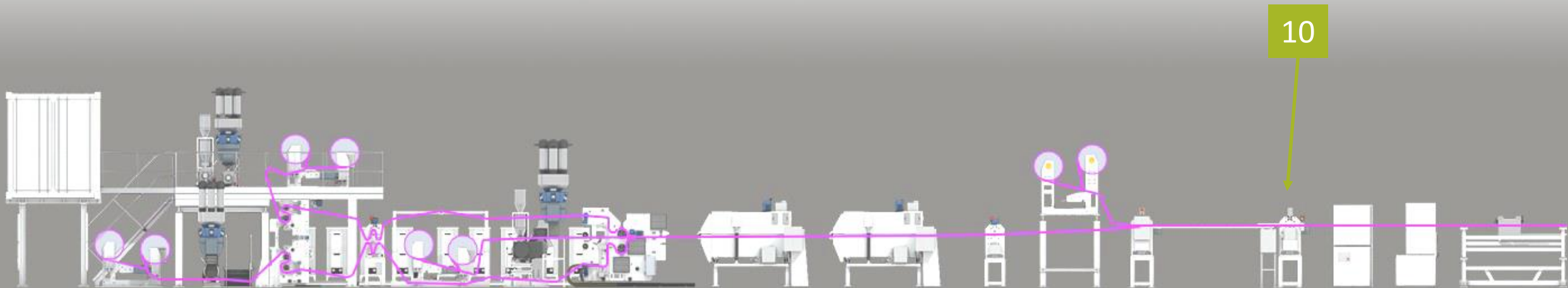


## Bubble Guard® Board

process flow

### Bending

Edge bending unit for in-line longitudinal side walls closure. Top and bottom layflat are bended and welded together thus getting a rounded, flat or 45° inclined edges.



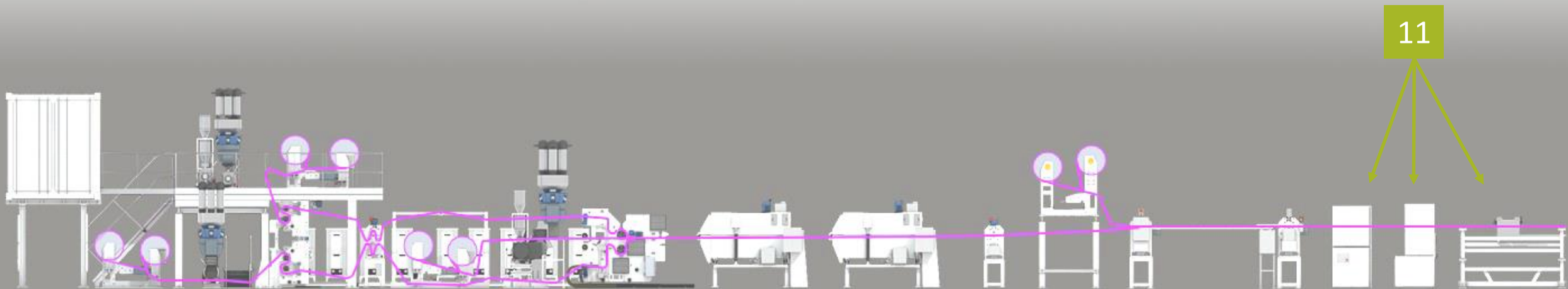


# Bubble Guard® Board

process flow

Cutting

Guillotine and/or Flight shear cutting systems provides perfect solution for board separation. Complete of stacking unit for material collection.



## Bubble Guard® Board machines range

### **BGS – Bubble Guard® Simplex:**

- No. of wall: 1
- No. of layers: up to 11.
- Thickness: up to 10 mm.

### **BGB – Bubble Guard® Board:**

- No. of wall/s: 1 or 2(\*)
- No. of layers: up to 11.
- Thickness: up to 15 mm.

### **BGD – Bubble Guard® Duplex:**

- No. of walls: 2
- No. of layers: up to 17.
- Thickness: up to 30 mm.

(\*) provision to have additional wall in future as per BGD line

## Bubble Guard® Board

### Conversion

#### A world of applications!

- Die cutting hot and cold method
- Thermoforming with male/female moulds
- Plotting, milling, creasing with several tools
- Printable



**Successfully** employed in automotive, logistics, building, advertising, steel, pharma, food & beverage.





**Thank you for your attention.**

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