



PET Closures for Performance and Recycling Circularity

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# FIRST TO PRODUCE PET BOTTLE CAPS AT SCALE

## THE INDUSTRY NEEDS A SOLUTION

- Flexible technology for multiple cap types
- Easy adoption, compatible with existing customer equipment

## BETTER PERFORMANCE & SUSTAINABILITY

- PET offers superior barrier properties vs HDPE and PP
- Enables bottle lightweighting

## IMPROVES RECYCLING CIRCULARITY

- Easy-to-recycle, can use rPET
- No additives needed to modify polymer
- Well suited for tethered solutions

## BENEFITS

# PERFORMANCE ENHANCED, FULLY RECYCLABLE

Practical and holistic recyclability solution for PET containers and cap together for the first time ever



### RECYCLABILITY

~99% of caps are NOT from recycled content today.



### BETTER BARRIER PROPERTIES

Better O<sub>2</sub> (40X) and CO<sub>2</sub> (30X) barrier properties support longer shelf life, thinner material.



### COMPATIBILITY

PCO1881 is the initial launch and other closures can be made manufactured.



### CUSTOMIZE

Dyes or labels can be added to customize color.

PCO1881  
**PP/HDPE**  
CAP



#### **NOT SAVE MATERIAL**

caps contaminate PET bottle recycling streams



#### **PP | HDPE DOWNCYCLED**

Typically reused in only non-food grade applications



#### **ORGANOLEPTIC ISSUES**

May have issues with taste, smell, or appearance that affect product quality.



#### **HIGHER PRICE FOR RECYCLED MATERIAL**

Low rates of HDPE and PP recycling limit supply and raise the price of the recycled material

PCO1881  
**PET**  
ORIGIN's CAP



#### **ENABLES CIRCULAR ECONOMY**

With bottles and caps produced from 100% post-consumer recycled PET and used in food-grade appl.



#### **SUPERIOR PERFORMANCE**

With improved barrier properties with respect to O<sub>2</sub> ingress and CO<sub>2</sub> emission



#### **MORE CUSTOMIZATION**

Caps are naturally clear, with the option to add color, printing, or embossing



#### **SCALABLE MANUFACTURING**

Able to support high volume supply for multiple cap types



# Caps breakthrough—from ‘Downcycle’ to ‘Whole-Container Recycling’

Origin’s PET breakthrough makes the cap truly recyclable – revolutionary for product circularity

## Today's Status Quo



### HDPE or PPCaps: ‘Downcycle’

- Must be separated from bottle during recovery
  - Downcycled, not recycled

## Origin PET Caps & Closures



### Whole-Container PET Recycling

- No need to separate bottles from caps
- True recycling & can use recycled PET
- Superior barrier: +shelf life, lighter weight

















# QUALIFICATIONS & BOTTLING TRIALS HAVE STARTED

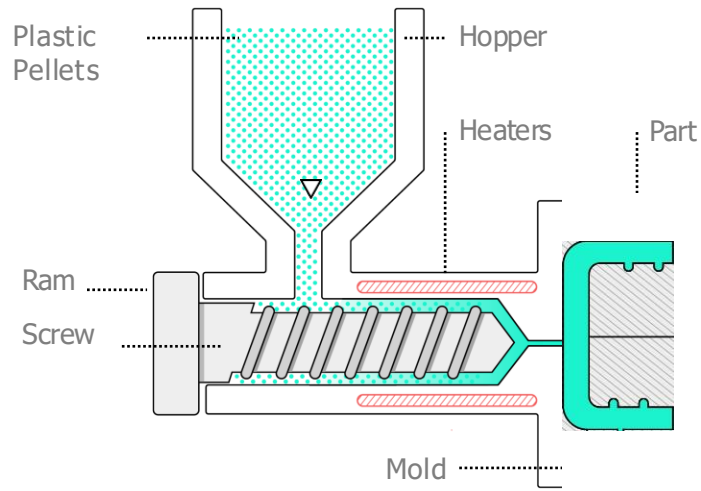
with several potential customers.

# Fundamental technology advantage – Origin PET caps beat alternatives

Origin has substantial patent protection and is set to lead a new category of closure

	Recyclable	Drop in	Potential for shelf-life improvement	Same material as PET bottle	Can be made with 100% recycled plastic	Aesthetics (clarity)	Lightest weight in class
THERMOFORMED							
ORIGIN							
HDPE   PP Incumbent							
INJECTION MOLDED							

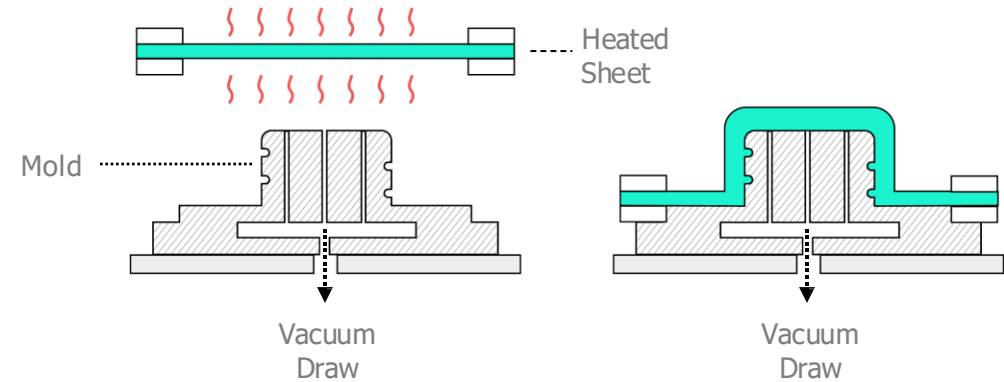
## × TRADITIONAL INJECTION MOLDING



### Problems for PET caps:

- Only certain plastics can be used (HDPE/PP)
- PET restricted for high t/L (thin wall injection molding)
- Difficult to eject from traditional molds
- You are constrained by how fast molten plastic can move in a tight space to fill the mold
- Line speed must decrease for bigger caps

## ✓ ORIGIN'S THERMOFORMING



### Advantages for PET caps:

- Caps are formed and stamped
- Cycle time remains the same regardless of cap size
- Thinner caps are possible (lightweighting)
- Origin-patented process enables thermoforming of PET caps and closures



# ORIGN CAPFORMER SYSTEM

Commercial Production in US  
kicked-off FEB 2025



## PATENT PROTECTED

Origin proprietary  
manufacturing



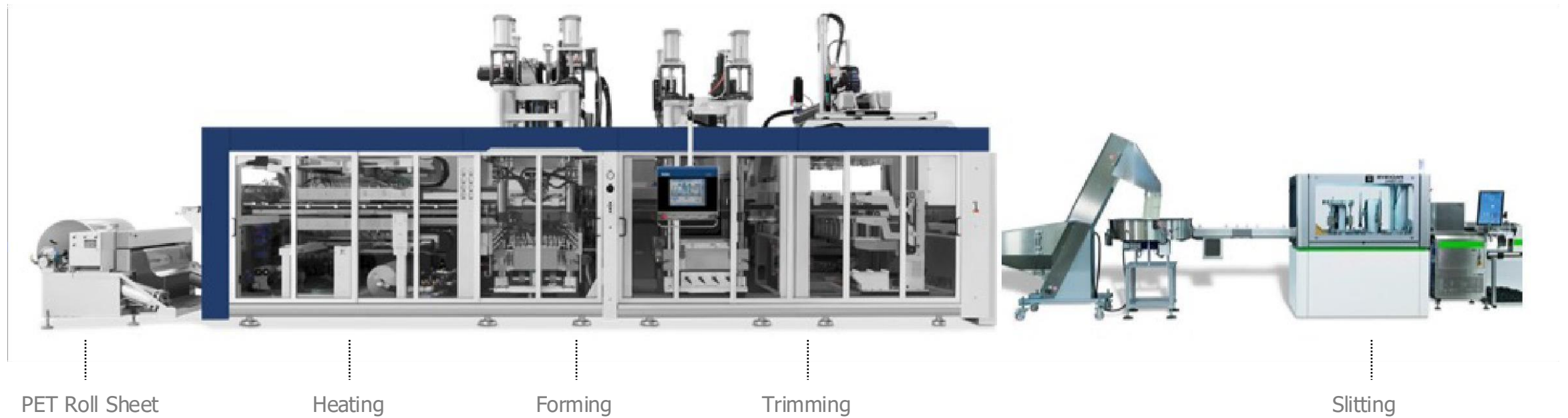
## SCALABLE

Multiple CapFormers  
expected Factory  
Accepted by EOY



## INNOVATION

Novel applications of  
thermoforming,  
proprietary technology



*Simplified CapFormer illustration*





# ENABLING THE WORLD'S TRANSITION TO SUSTAINABLE MATERIALS