



Bio-based materials for appliances

The Electrolux experience

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Who we are

Electrolux shapes living for the better by reinventing taste, care and wellbeing experiences, making life more enjoyable and sustainable for millions of people. Founded in Sweden in 1919, we're a global leader in appliances for households and professionals. Our main strategic drivers are to act sustainably, create better experiences and always improve!

122
billion SEK in sales

150
markets reached

60
million products sold
annually

56,000
employees



An offering for best-in-class consumer experiences



Taste

The offering includes cookers, hobs, ovens, hoods, microwave ovens, refrigerators, freezers, dishwashers and small appliances.



Care

The offering includes washing machines, tumble dryers and other small appliances for fabric care, such as irons.



Wellbeing

The offering includes vacuum cleaners, air conditioning equipment, water heaters and heat pumps.

Electrolux is the only appliance company with a complete offering for consumers as well as for professional food, beverage and laundry service customers.



Strategic Drivers

Act sustainably

Inspire and contribute to a change for the better

Create better experiences

Design solutions that elevate everyday life

Always improve

Think new and never settle

RECYCLED PLASTICS

End of Life

- Reuse of resources



Carborec®



BIOPLASTICS

Extended environmental benefits

- Favourable resource extraction profile



- Extended End of Life options

End of life options	Bioplastics	Conventional plastics
Composting	✓	✗
Recycling	✓	✓
Incineration	✓	✓
Landfill	✓	✓

LCA-driven approach



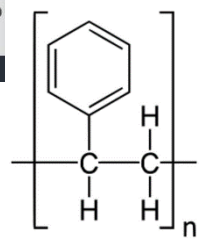
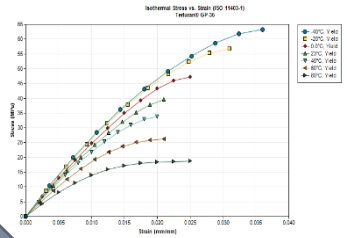
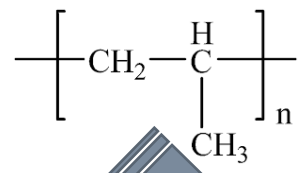
Bio-based plastics for durables

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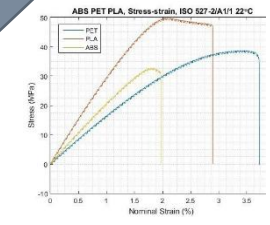
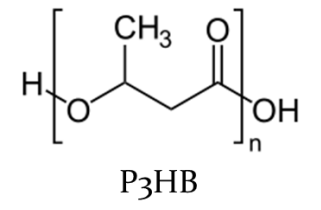
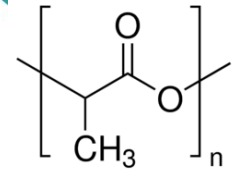
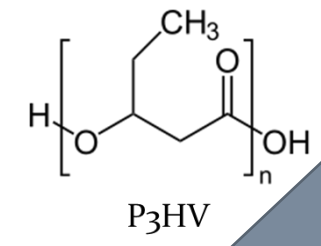
A Acrylonitrile
 C_3H_3N

B 1,3 - Butadiene
 C_4H_6

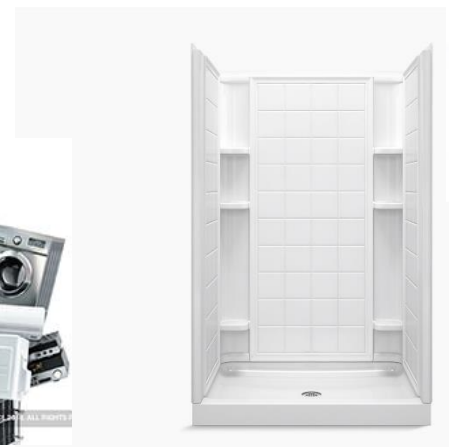
S Styrene
 C_8H_8



Oil-based plastics



Bio-based plastics



Replacement opportunities



PLA **ABS** rPET, rABS
SAN rSAN
PS
HIPS rHIPS
PHA **PP** rPP
PA1012, PA1010 **PA12**



PLA and its use for refrigerators



Fridge components and process technologies

Inner liners

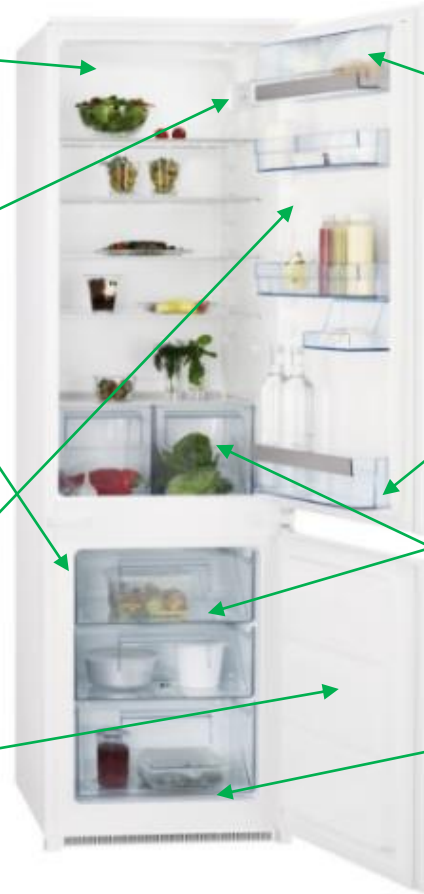
*From HIPS to PLA
(thermoforming)*

Thermostat covers

*From ABS to a/cPLA
(injection moulding)*

Door liners

*From HIPS to PLA
(thermoforming)*



Door shelves

*From GPPS to aPLA
(injection moulding)*

Flaps

*From GPPS to aPLA
(injection moulding)*

Drawers

*From GPPS to aPLA
(injection moulding)*

Main advantages of PLA vs. fossil-based plastics

- Consumer benefits

Certified environmental friendly
Superb appearance: high gloss, stable white
Tough: strong crispers and accessories

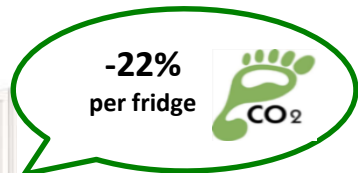
- Applications

The green alternative for functional and aesthetic parts:

- control panels
- frames
- handles
- etc.



-83%
on plastics

-22%
per fridge

- Material PLA

Thermoplastic polyester similar to classical thermoplastics (e.g. polystyrene).

Widely used in packaging materials (films, bottles), disposable dishes, sheets, fibres, etc.

Better mechanical and chemical properties

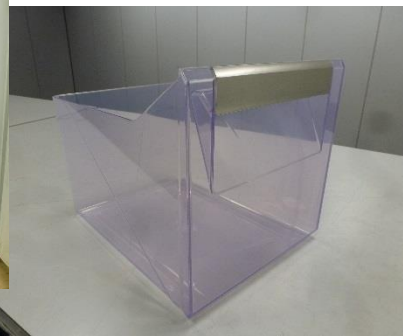
- Technology brief

Same manufacturing technologies as today
Potential **higher productivity**



Main constraints to PLA use for durables

- Low softening temperature of aPLA
- Higher density vs. styrenics
- Transparency not as high as styrenics
- Higher mould shrinkage of cPLA vs. styrenics
- Higher cost vs. styrenics



Further developments based on PLA strong points

- **Take advantage of PLA high melt strength (thermoforming)**
 - Possibility to reduce wall thickness
 - Higher thickness homogeneity
- **Apply cPLA to components produced by injection moulding**
 - Handles (WM, TD, WD, DW)
 - Control panels (WM, TD, WD, DW)
 - Door frames (WM, TD, WD)
 - Components for refrigerators (door end caps, light boxes, etc.)
 - Components for HC&SDA (air conditioners, vacuum cleaners, etc.)
- **Exploit PLA compatibility with other polymers**
- **Develop improved PLA-based compounds (filled/reinforced)**



THANK YOU FOR YOUR ATTENTION!