

**Welcome to the
30th Anniversary of the
Graphic Art and Media Faculty –
HCMC University of Technologie and Education**





Since not all of You will seek a future in Arts and Media, some of You might succeed in the field of consumer related products, and here specifically in the field of consumer packaging.

Having a closer look at this field, we will find out that the impact on the consumer is related, besides haptic, positioning, very much to how an specific image is printed on the packaging.

With the packaging more and more being Plastic Films, of one sort or another, understanding the Medium helps Efficiency & Sustainability !

**Successful Partnership for
sustainable film production**





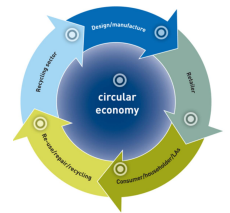
Optimizing the Value Chain of Today's and Tomorrow's Sustainable Packaging Markets in a Circular Society

Successful Partnership for
sustainable film production





Packagings environmental impact causes an ambivalent attitude in society. This is leading us into a Circular Society





Reifenhäuser 1911



Reifenhäuser 2017

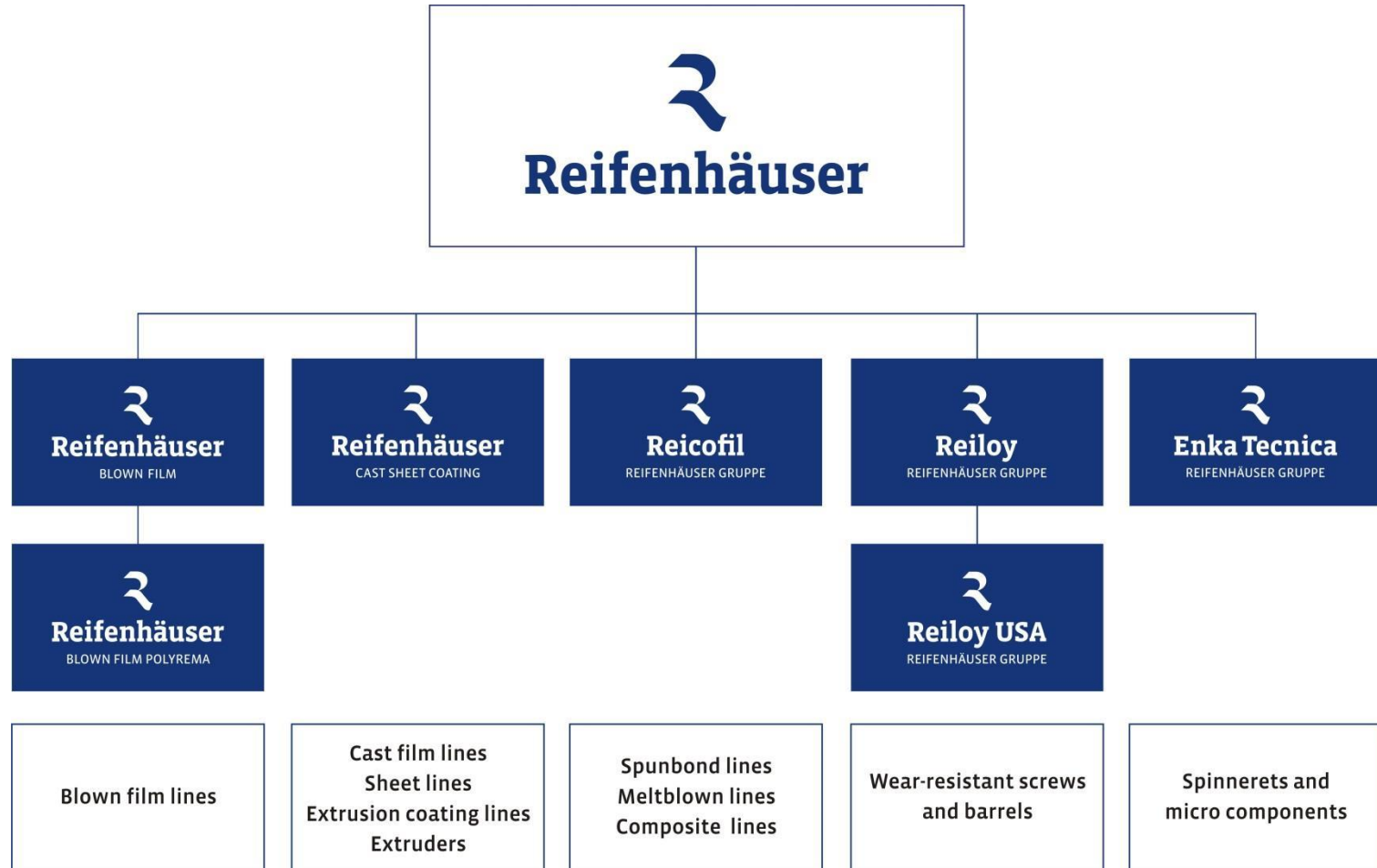


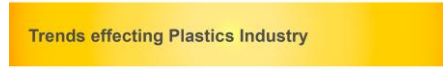
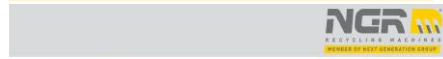
The leading supplier of sustainable solutions for the production of Packaging Films



Market Leadership

Focussed Business Units



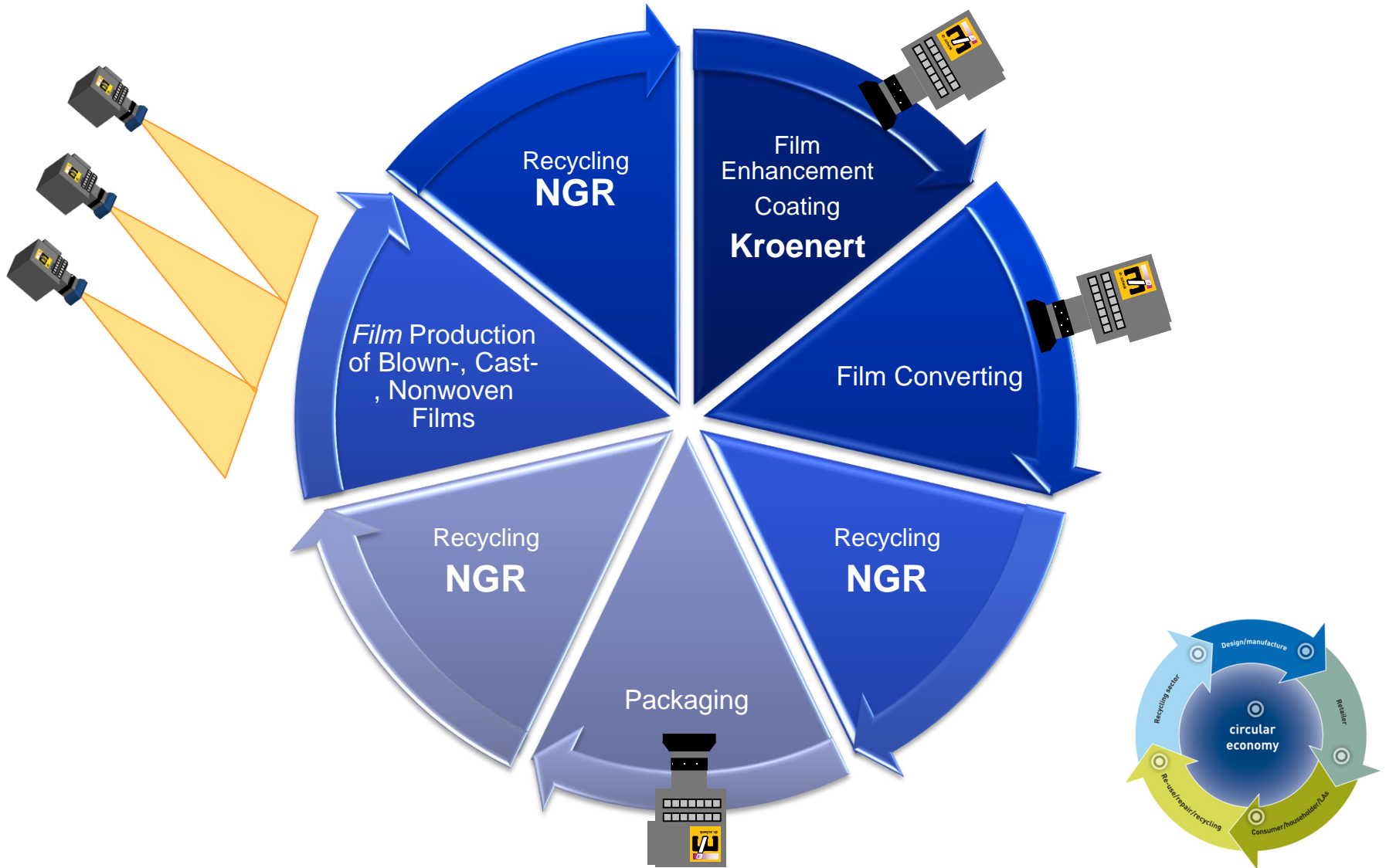


Next Generation Recyclingmaschinen GmbH



The Reifenhäuser Business Concept

the Circular Partnership





Functional Designs for a Sustainable Circular Society

Drivers for flexible Packaging „Retort Pouch“

- Demographic demand for single portion packs – lower costs
- Food safety , sterile packaging with long shelf life - + 3 years
- Less wastage of damaged stock
- Reduced shelf display area
- Faster shelf re stocking
- Higher display impact
- Lower distribution costs – 1 container lorry can replace 25 containers with tin cans
- Fewer logistic movements to manage



OVERVIEW OF MAIN BENEFITS TO CONSUMERS

- Consumer convenience – every one can cook now – even me !
- Demographic demand for single portion packs – lower cost / meal
- More cost effective meals
- Improved flavour due to reduced over cooking
- Lower energy cooking costs in the home
- Food safety , sterile packaging with long shelf life
- Reduced waste disposal





OVERVIEW OF MAIN BENEFITS TO FLEXOGRAPHY

- **Major growth** area of packaging
- Speciality segment with added value
- Need for high quality print and short runs
- Multiple designs
- Pet food opportunity



TOTAL RETORT OVERVIEW

1. Ingredient preparation
2. Cooking by manufacturer
3. Food is vacuum - filled into the Retort Pouch
4. Sterilization under pressure and temperature profile 116 - 130 °C for 45 mins compared to 4 hours in a tin can ,the process of Retort has 15 variables !
5. Retort pouch shelf life typically - 3 years below 27 °c



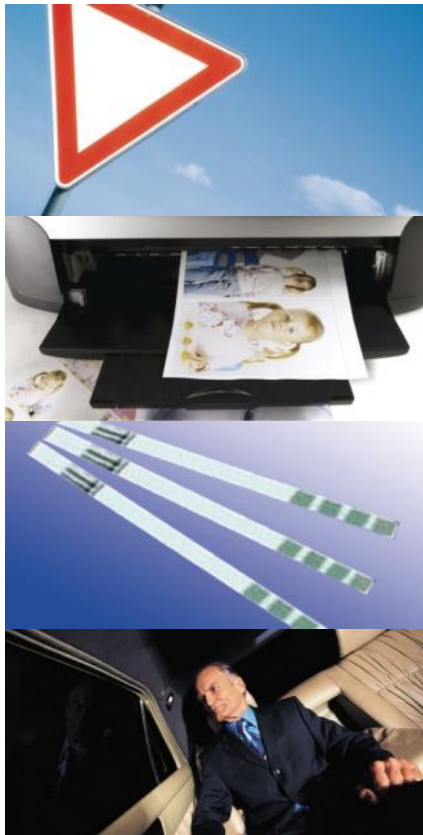


The Group of Companies

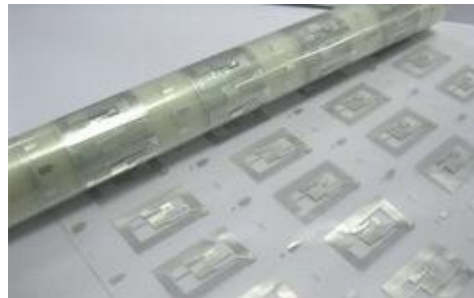
KROENERT  **BMB**  **DRYTEC**

KROENERT  **BMB**  **DRYTEC**

Samples for coated products



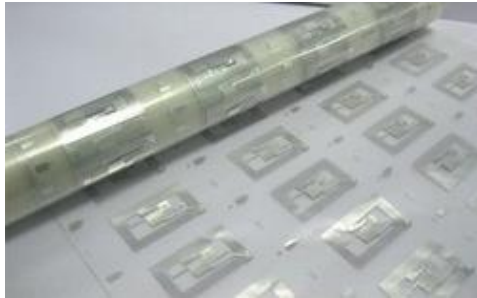
Applications for organic and printed electronic



- **Labels with information transfer by Near Field Communication (NFC)**
- Electro luminescent layers
- Electro chrome layers like used for the window shades in the Dreamliner B787
- **Foldable electronic magazines and displays**
- Bighting wall paper
- Printed boards
- RFID-antenna
- **Printed sensors**
- Organic solar cells



Applications for film functionalization



- **Display protective tapes with self-adhesive layers**
- Easy clean / anti-smudge coating layers
- PU, acrylic or epoxy adhesive (OCA) and contrast film, self-adhering, clean removal (60 – 120 μm thickness usually)
- Application of optically clear acrylic adhesive on 50 μm PP protective film (25 – 50 μm thickness usually)
- **Application of printed conductive materials**
- Application of anti-reflective layers
- Self-adhesion foam tape in between the different functional layers
- Any kind of coated tapes
- Bonding films
- Any layer for the battery (anode, cathode, separator membrane)

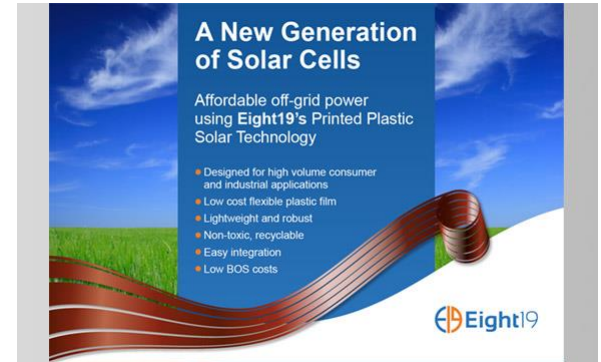
Applications for organic and flexible PV



Quelle: 1000solarideen



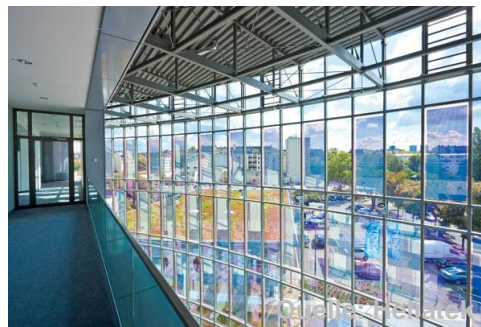
Quelle: Eight19



Quelle: Eight19



Quelle: Daylgreen



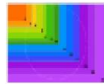


Digital Label Printing made easy

SPECIFICATION

NEO MERCURY LABEL PRESS NM-210W / 350W

SPEC



Max. Print Width
·NM210: 220mm
·NM350: 330mm



50 m/min , 1200 DPI



C. M. Y. K. White



X 12, 15

2558 Nozzle (High Speed)
Drop size: 0, 3, 6, 13pl



Variable Data Printing



No Rigid Substrate



Roll-type Substrates



UV-curable Ink DCX 610



Variable Dots 4-Levels



Reifenhäuser

BLOWN FILM

The Extrusioners

Game Changing Technology improving Processes & Efficiency along the Value Chain

for flexible Packaging Films



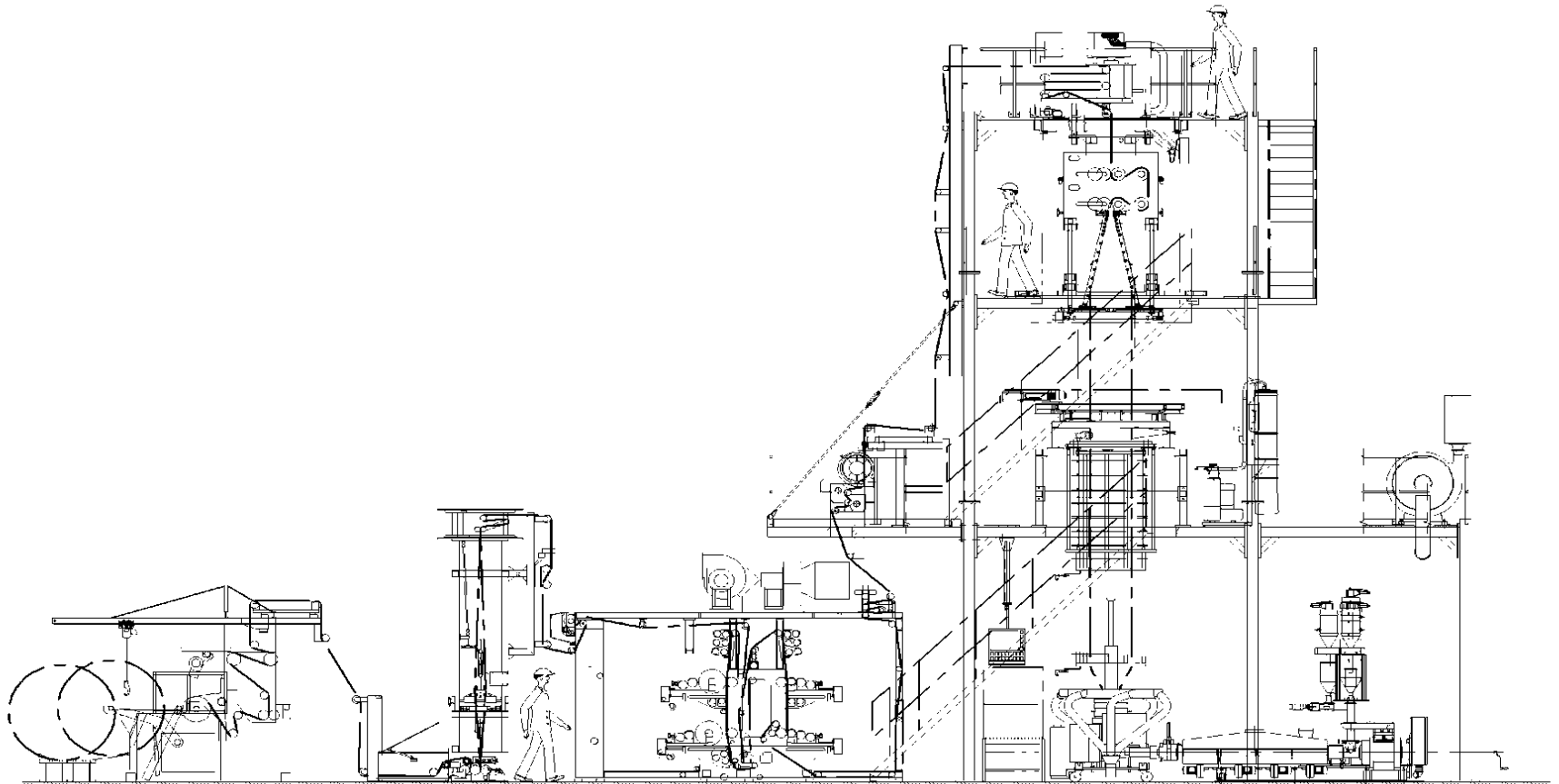
Form Fill Seal Sacks FFS – Heavy Duty Sacks

Printing System integrated in the Production Process



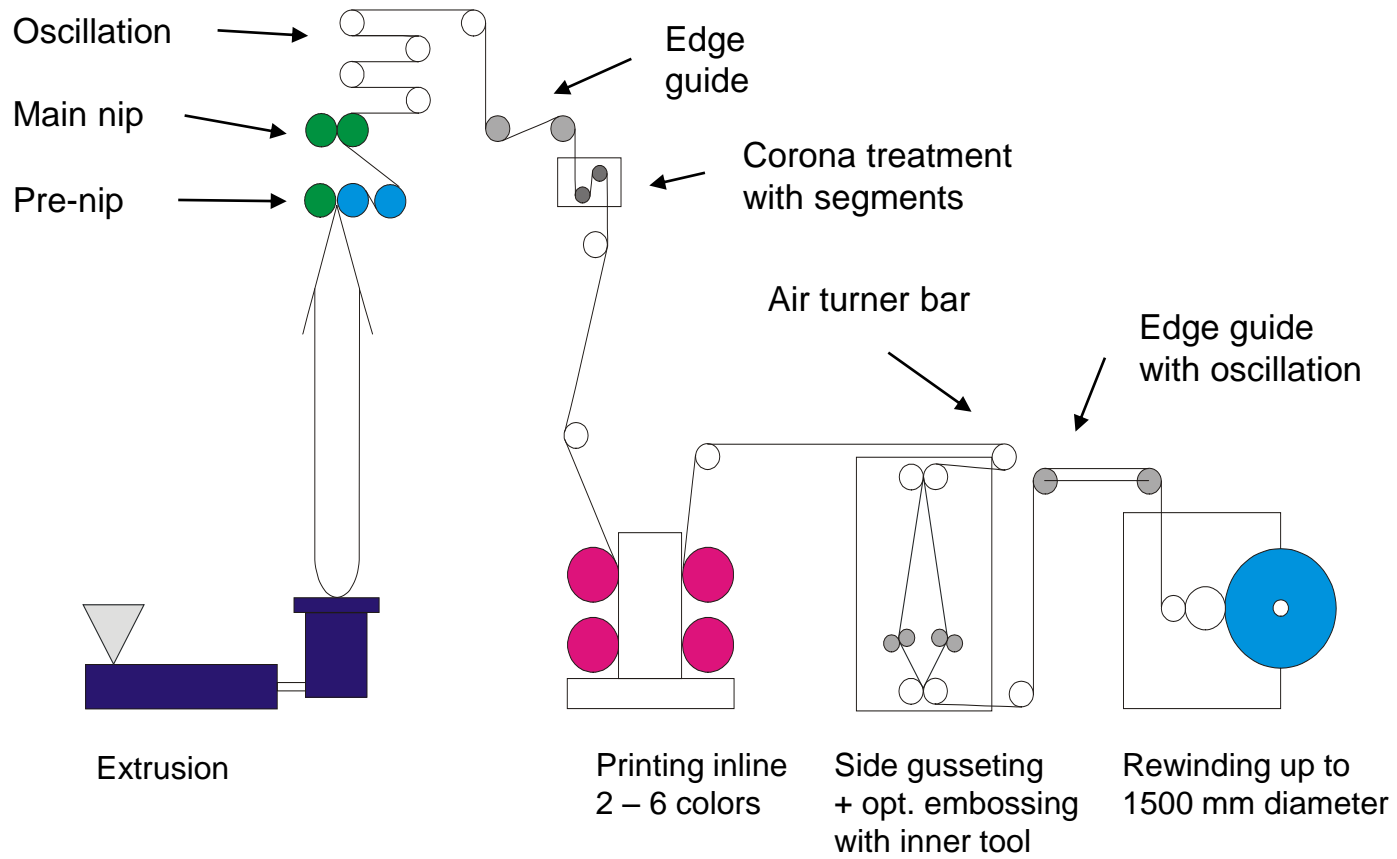


INLINE process for production of FFS





INLINE process for production of FFS





Reifenhäuser

BLOWN FILM

The Extrusioners

➤ **EVOLUTION Ultra Flat**

Patent

Game Changing Technology

for flexible Packaging Films

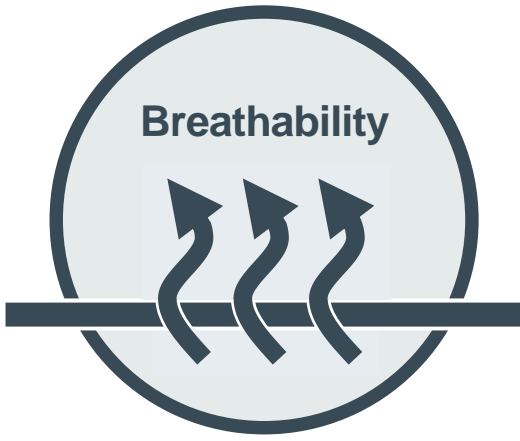
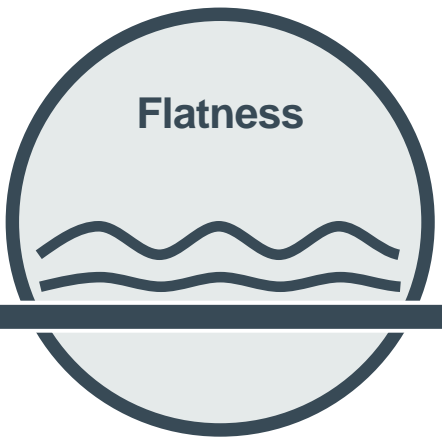
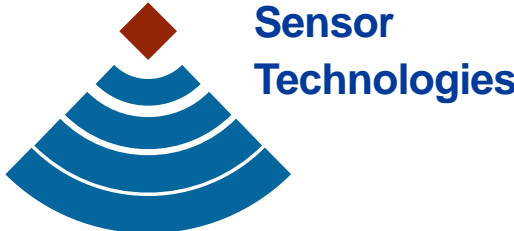
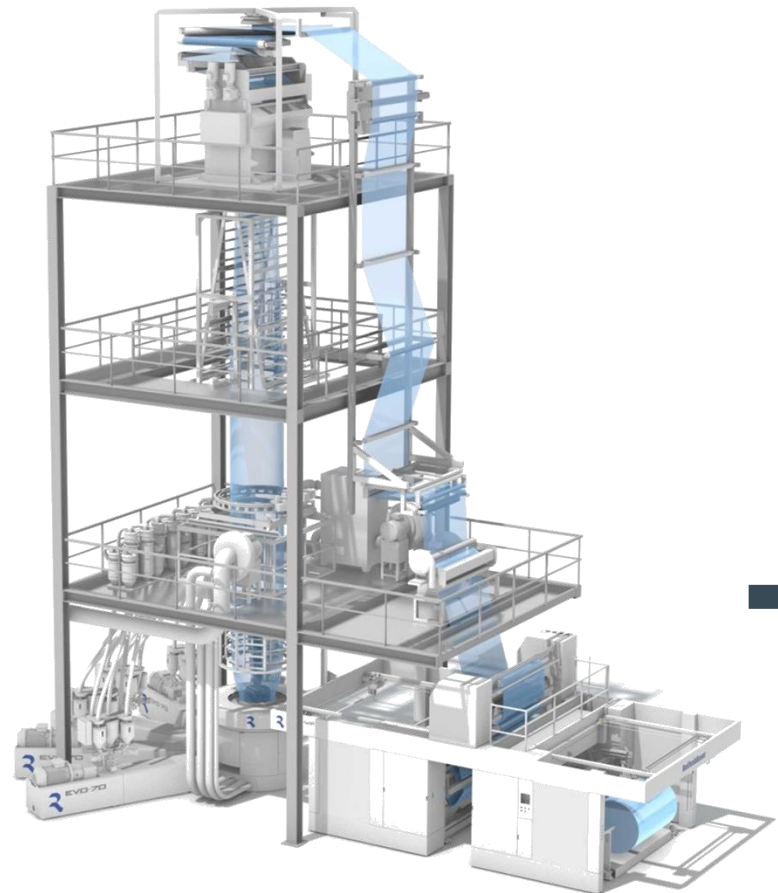


Tech Trends 2017

Extrusion – Flexibility & Quality

Product Quality

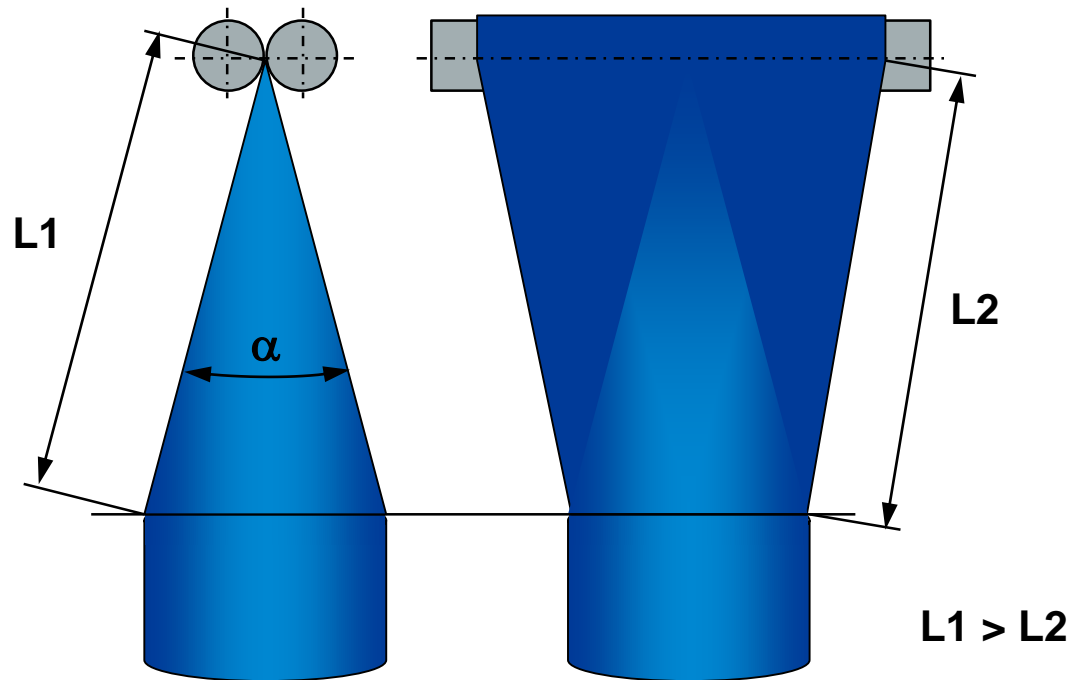
New measuring Capabilities change your Quality Standards



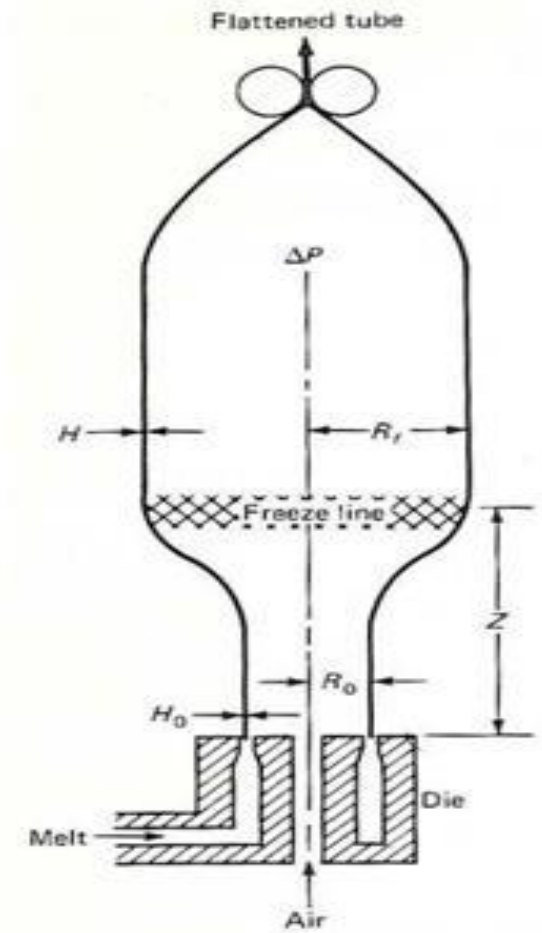
Examples of film quality enhancement

Definition of camber

Camber of film is caused mainly by different lengths in the collapsing frame



Length differences depend on collapsing angle α ,
e. g. for a collapsing angle 11° : 0.34 % length difference

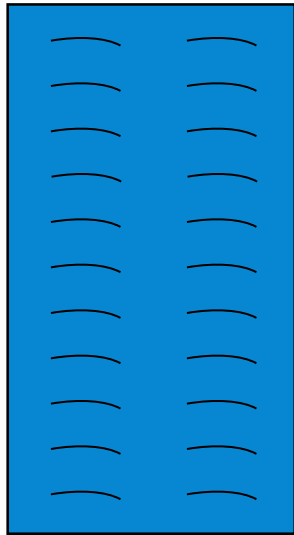




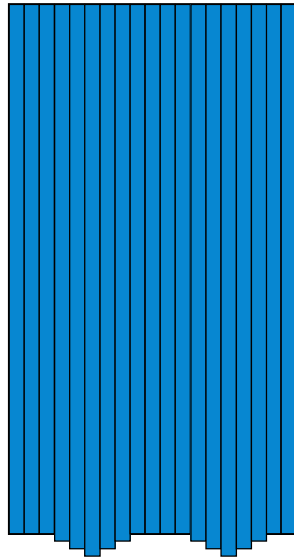
Film Property Imperfections caused by Freezing the molecule chains and by Bubble collapsing

Definition of flatness

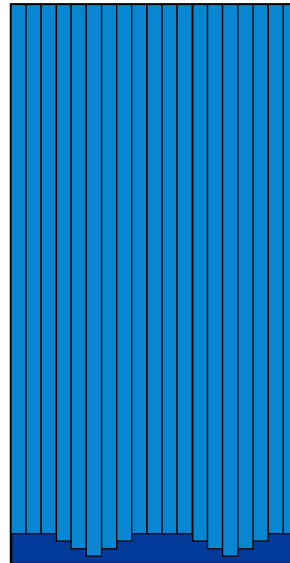
Bagginess in the film are mainly caused by temperature variations



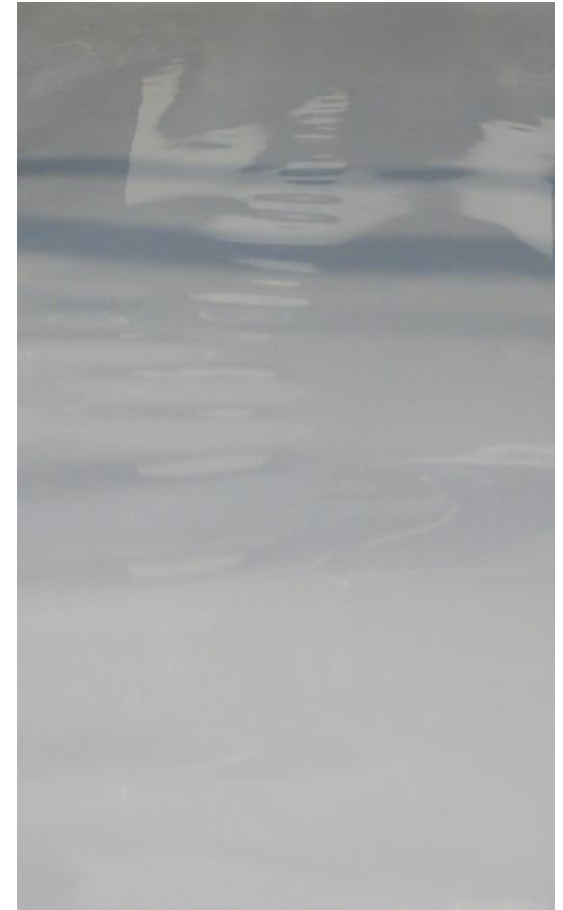
Bagginess in the film



Bagginess leads to different lengths of the film, when cutting into stripes



Slightly stretching of the film optimizes film flatness



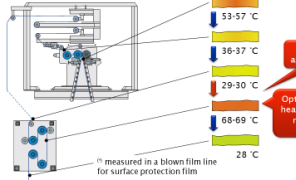


Flatness Enhancement Comparison of different systems

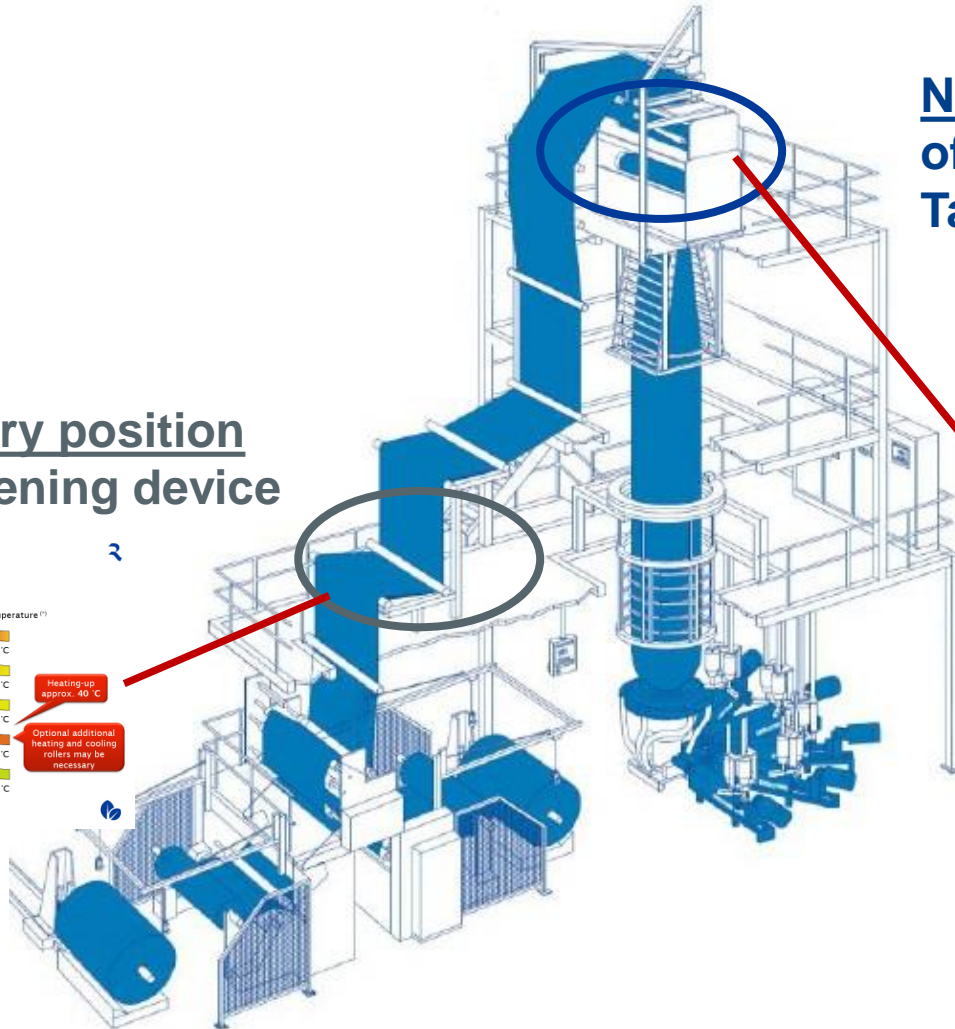
Ordinary position of flattening device

23.01.2017 | 35 | 4.3
Flatness Enhancement
Comparison of different systems

Take-off System with cooling rollers
and additional flattening device



Heating-up approx. 40 °C
Optional additional heating and cooling rollers may be necessary

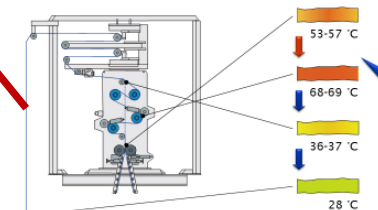


New position of EVOLUTION Ultra Flat Take-off System

23.01.2017 | 36 | 4.3

Flatness Enhancement
Comparison of different systems

EVOLUTION Ultra Flat



Heating-up only approx. 15 °C and homogenising of film temperature

a Reifenhaeuser patented Technology.
Already proven in more than 10 Machines in Asia



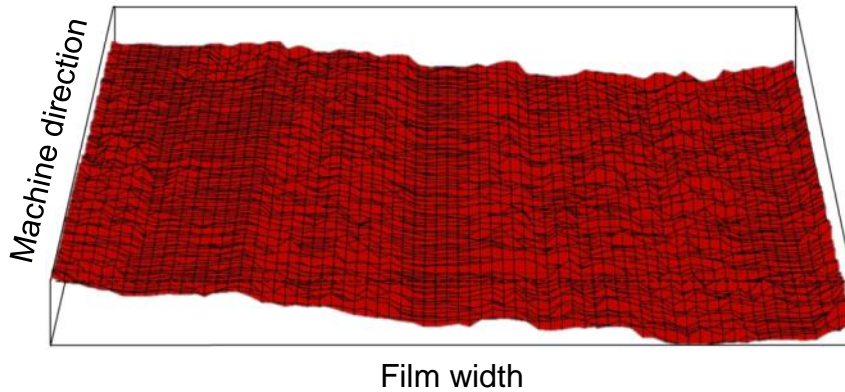


Examples of film quality enhancement

Improvement of film flatness

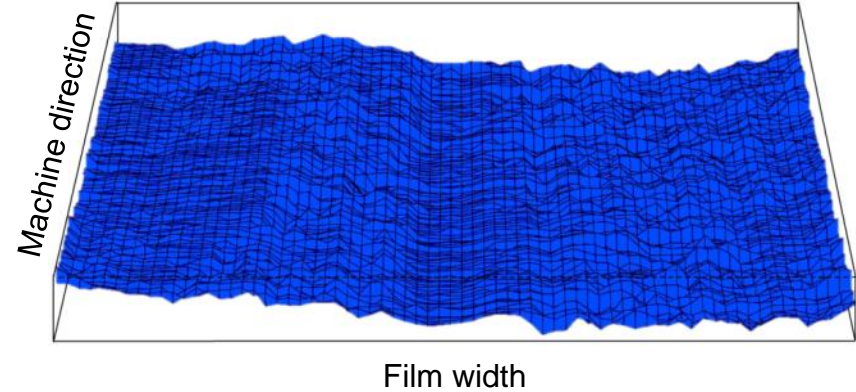
Label film 80 μm produced **without** EVO Ultra Flat

Film flatness profile

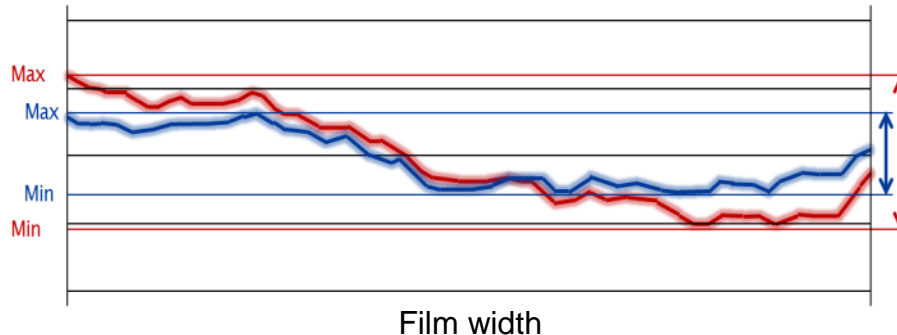


Label film 80 μm produced **with** EVO Ultra Flat

Film flatness profile



Medium flatness values



$2\sigma = 1.43 \text{ mm}$

$2\sigma = 0.83 \text{ mm}$

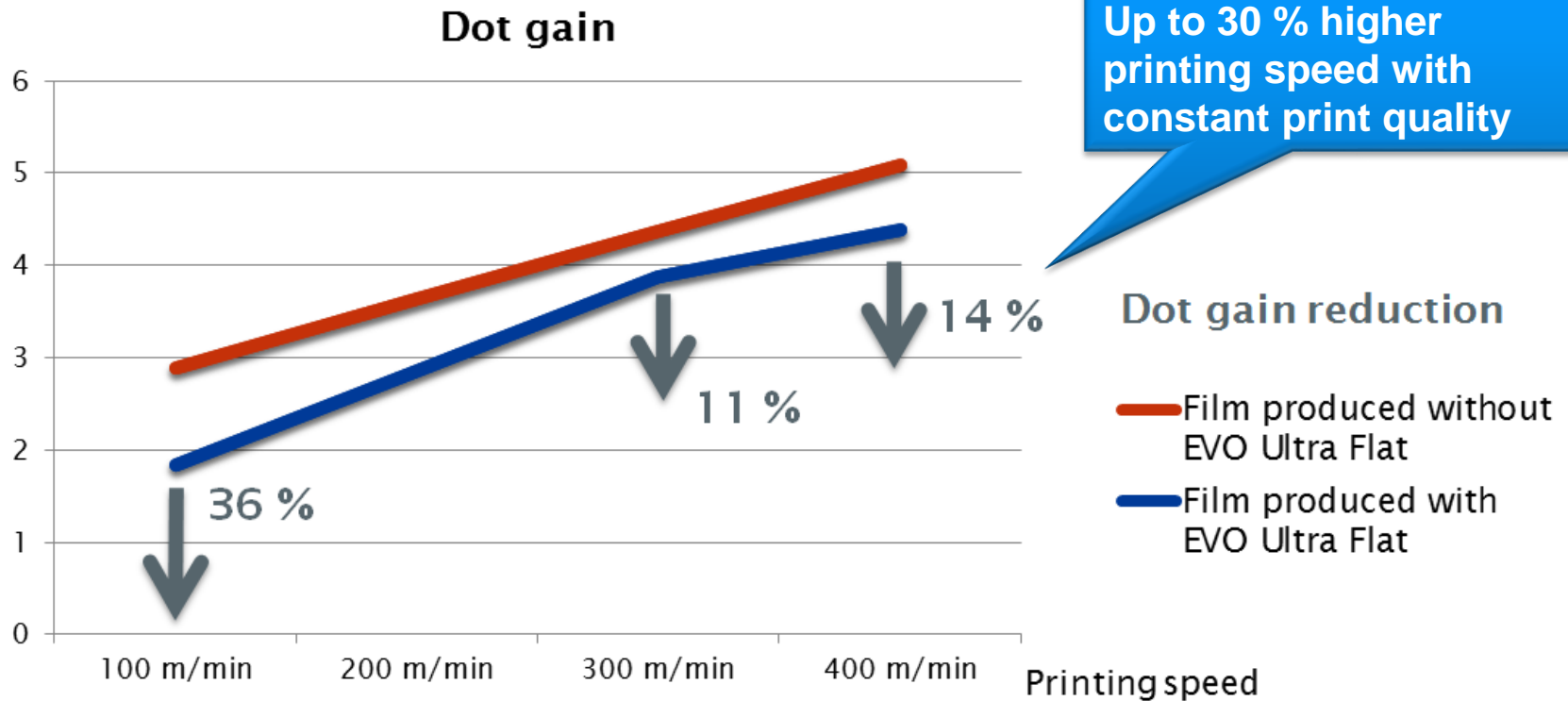
$\downarrow -42 \%$

Flatness of this label film improves by 42 % by use of the EVO Ultra Flat



Examples of film quality enhancement

Improvement of printing quality (flexo print)



Dot gain improvements result in more precise color register with less printing impression which significantly improves plate life



Examples of film quality enhancement with UltraFlat

Comprehensive tests with film converters and universities confirm improvements of

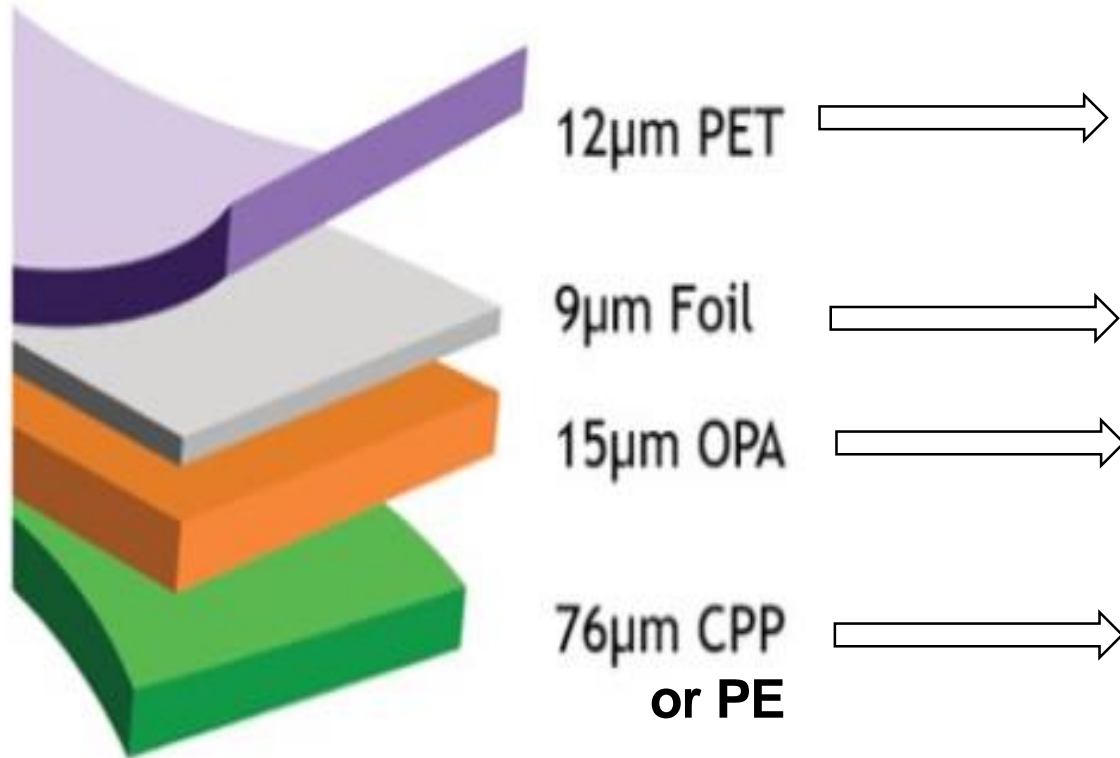
- **Better Film flatness**
- **Lesser Film camber**
- **Better Printing quality**
- **Higher Printing speed**
- **Higher Lamination quality & efficiency**





Standard Pouch Packaging with Alu foil for Barrier

4-PLY STANDARD FOIL STRUCTURE



**Future Packaging
tailored Function &
optimised Recyclability**

**PE Top Film
revers Print**

**To be replaced by innovative
5-layer Pure PE Structures
or were needed by
Tailored Barrier Structures**



None recyclable or fully recyclable Packaging

PE or PP (inside layer)

Sealing layer gives the needed weld strength to the valve



OPA

Enhanced high-pressure mechanical resistance

Aluminum

Barrier from gases, moisture, aroma, light and other external factors

PET (outside layer)

Laminate integrity, Alufoil protection and mechanical resistance

Adhesives

High bond strength between layers ensures high mechanical resistance, high chemical resistance adhesive used for aggressive filling goods (delamination resistance)





Fully Recyclable Pouch Packaging for a Sustainable Circular Society



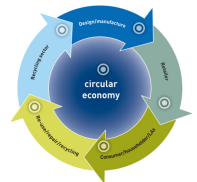
UltraStretch PE Top Film + reverse Print

Print on PE Top Film

Laminating Adhesive can include Barrier Function

Base Pouch Film PE or CPP Can include barrier function

Future Packaging tailored Function & optimised Recyclability





Reifenhäuser

BLOWN FILM

The Extrusioners

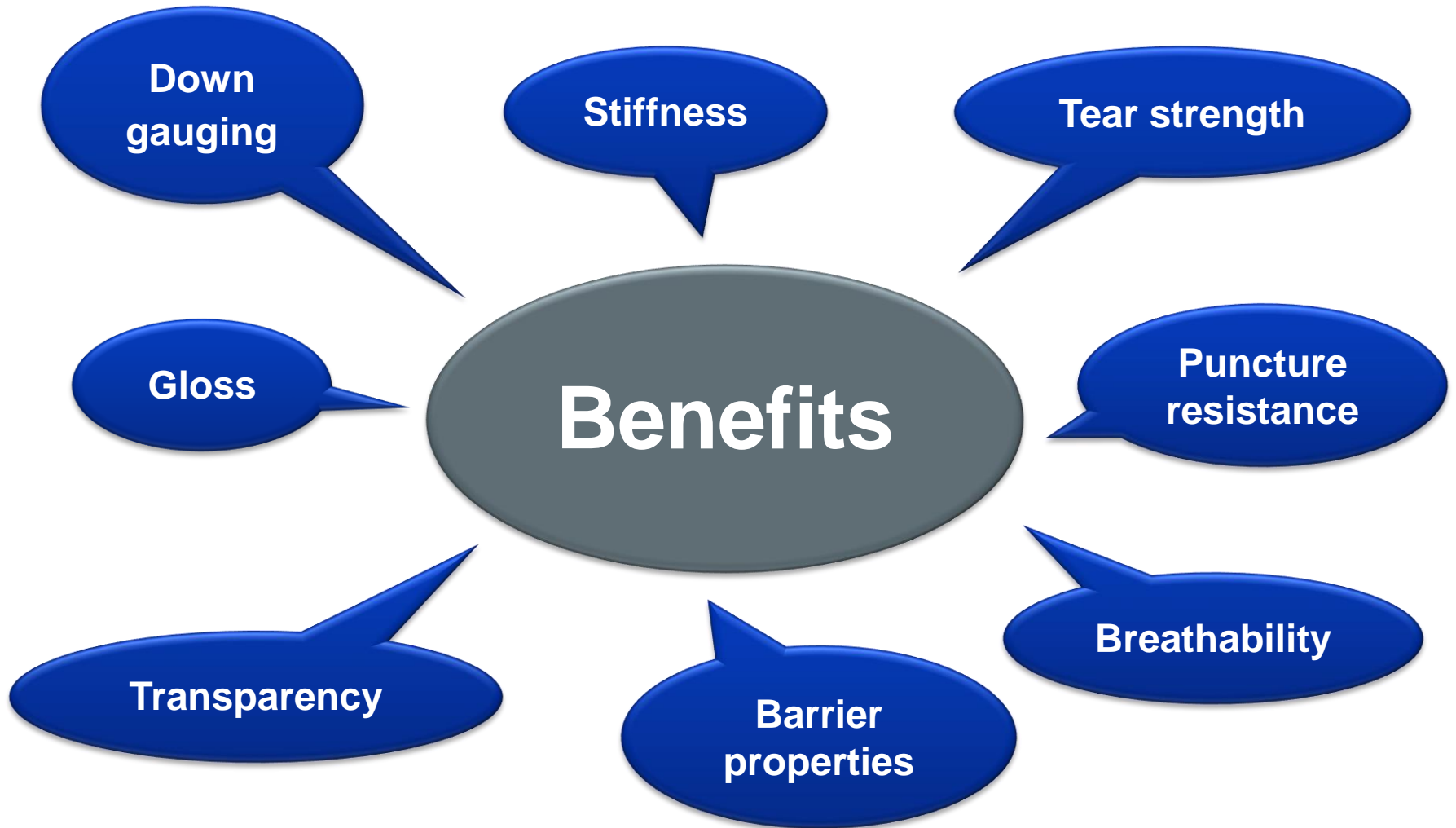
Patent

EVOLUTION ULTRA STRETCH

Why stretching of Blown Film will become the new standard

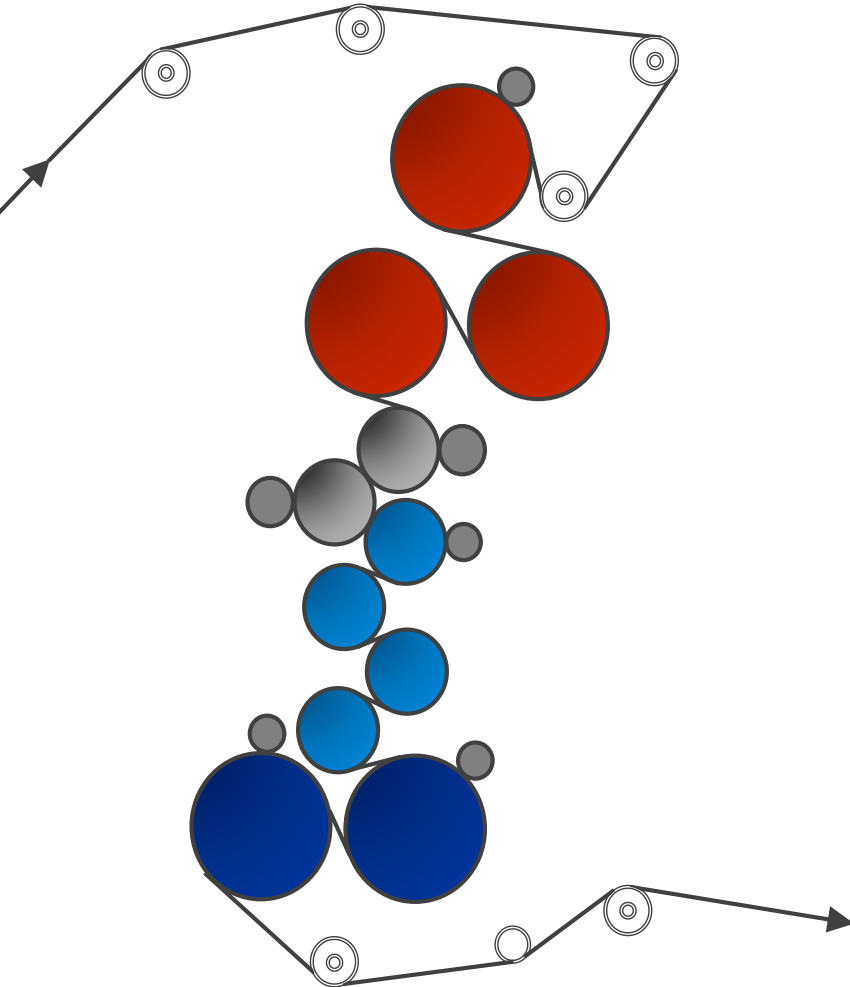


Why stretching film?





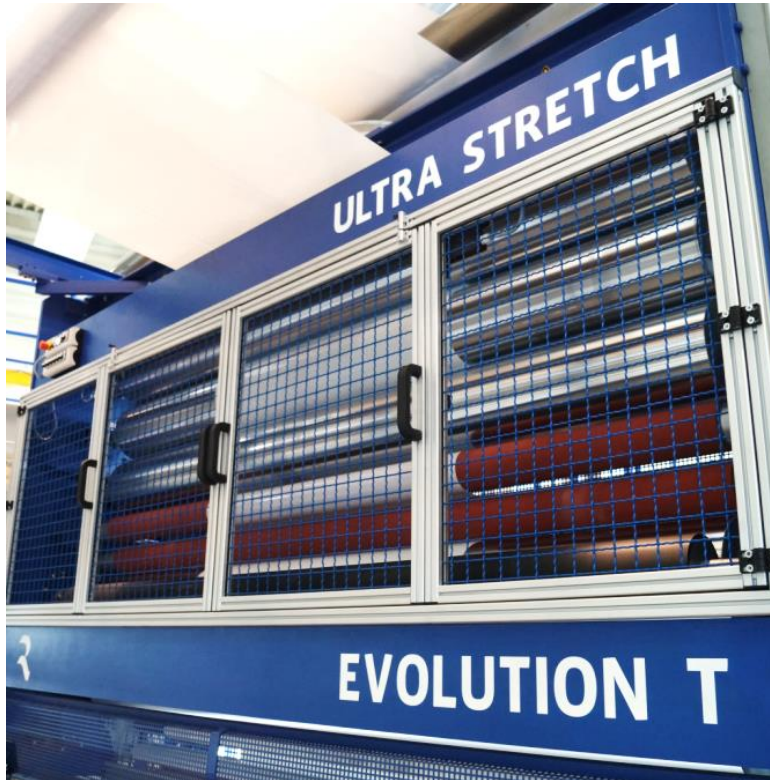
Stretching of Film



-
- Increasing film temperature
-
- Stretching
-
- Balancing
-
- Cooling
-



EVOLUTION ULTRA STRETCH



- Easy way of **down gauging** with same or better film properties for numerous applications
 - **Silage wrapping film**
 - **Compression bag film**
 - **Breathable Film**
 - **Replacement of PET top film**
- High energy-efficient process
- Significant lower investment costs for EVOLUTION Ultra Stretch compared to traditional film stretch units
- Easy to operate: Less web brakes due to low level of crystallinity
- Can be by-passed

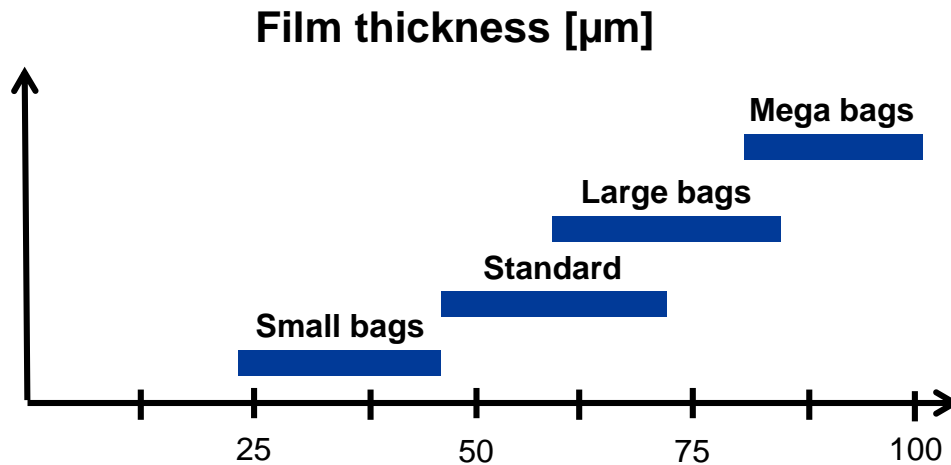




**Compression bag film
produced with EVO Ultra Stretch**



Compression Bag Films



Important film properties

- Good mechanical strength
- Good seal strength
- High stiffness
- Low COF
- High opacity
- High gloss
- Good printability

Production steps



Film production on blown film line

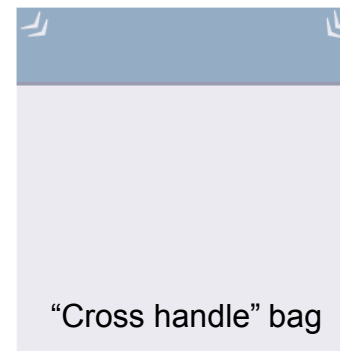


Bag making



Bag filling at end of diaper manufacturing line

Transparent film for handle, thickness 75-120 μm



"Cross handle" bag



Paramount bag

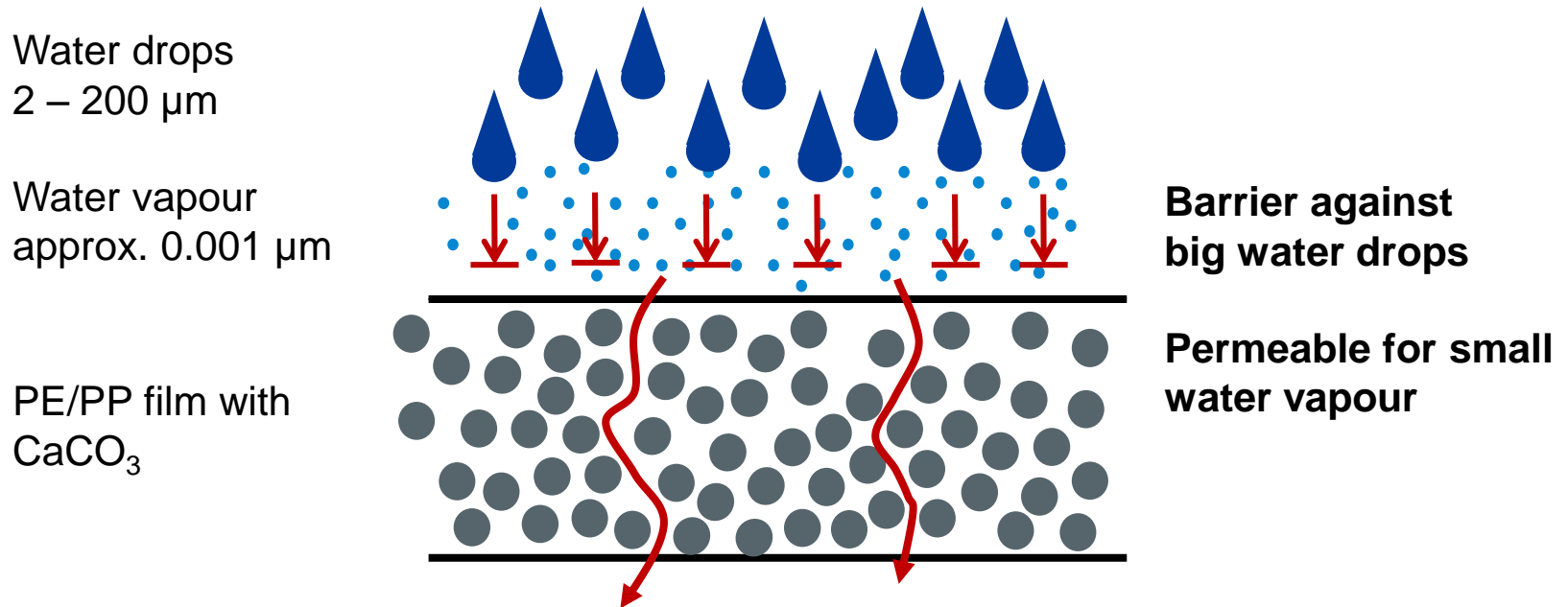


**Breathable backsheet film
produced with EVO Ultra Stretch**



Breathable Backsheet Films

Function principle of breathable film



- Grammage of 10 to 30 gsm
- Typically 3-layer structures
- WVTR 1000 – 6000 $\text{g}/(\text{m}^2 \text{24h})$ at 38 °C, 90 % RH
- Good mechanical properties
- Soft touch
- Humidity management
- Good printability





Thank you very much

Always at your service

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