



The European voice of the **adhesive and sealant industry**

FEICA WEBINAR

Communicating on adhesives in plastic recycling

28 April 2021

10:00 - 11:00 Brussels CET

Proceedings

- Please be advised that this webinar will be recorded for internal use only. By joining, you are consenting to the recording
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- During the Q&A session following the presentations, you will be able to use the chat box to ask questions
- In case we don't have sufficient time during the Q&A session to address your question, please feel free to send your question to info@feica.eu
- The presentation slides will be sent to all webinar registrants

Speakers - Moderators



Jana Cohrs

Executive Director Regulatory Affairs, FEICA



Dr. Dennis Bankmann

Senior Manager Circular Economy, Henkel and Vice Chair, FEICA Task Force on the Sustainability and Recycling of Adhesives Applications



Dr. Silvio Bassi

Regulatory Manager, COIM and Chair, FEICA Task Force on the Sustainability and Recycling of Adhesives Applications

Agenda

- 10:00 FEICA introduction
Ms Jana Cohrs, Executive Director Regulatory Affairs (FEICA)
- 10:05 Applications of adhesives in plastic packaging
Dr Dennis Bankmann, Senior Manager Circular Economy, Henkel and Vice Chair, FEICA Task Force on the Sustainability and recycling of Adhesives Applications
- 10:20 Types of adhesives chemistries relevant to plastic packaging
Dr Silvio Bassi, Regulatory, Regulatory Manager, COIM and Chair, FEICA Task Force on the Sustainability and recycling of Adhesives Applications
- 10:35 Terminology and definitions to be used when communicating on adhesives
Ms Jana Cohrs, Executive Director Regulatory Affairs (FEICA)
- 10:45 Q&A – by Dr Silvio Bassi and Dr Dennis Bankmann
- 11:00 Close of the webinar



Jana Cohrs

Executive Director Regulatory Affairs, FEICA

Introduction



FEICA facts and figures

FEICA represents **800+** adhesives and sealants producers in Europe, through its National Association Members in 16 countries, 24 Direct Company Members and 19 Affiliate Company Members.

The adhesive and sealant industry*

- represents about **2%** of the total European chemical industry's turnover
- contributes more than **17 billion euros** to the EU economy
- **employs** more than 45,000 people
- invests about **470 million euros** on **Research and Development**

* source: FEICA / Smithers



FEICA - Association of the European Adhesive & Sealant Industry

15 National Associations
representing 16 countries
+800 members



24 Direct Company Members



19 Affiliate Company Members

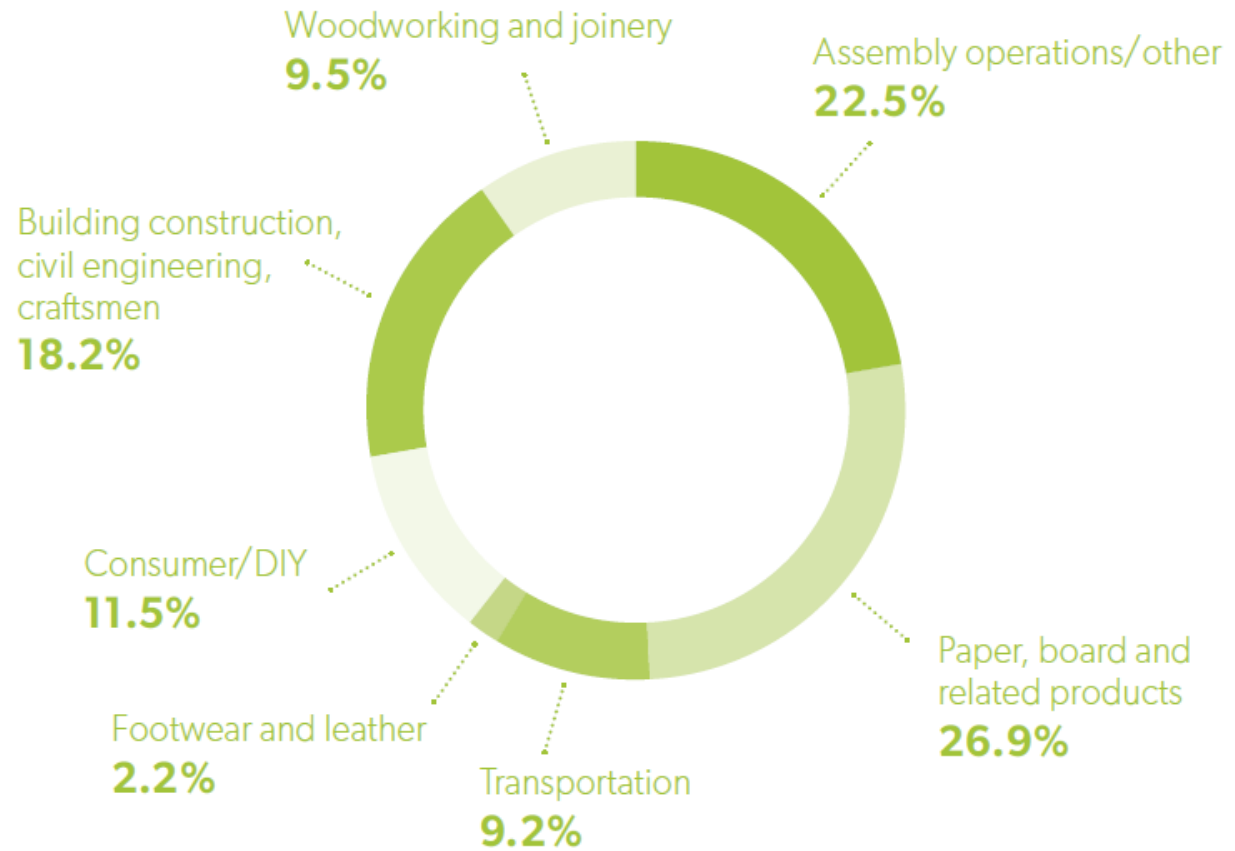


Markets



The European adhesive and sealant market 2020 End-use sectors

€17.1bn



.....● Data source: Smithers



Dr. Dennis Bankmann

Senior Manager Circular Economy, Henkel and
Vice Chair, FEICA Task Force on the Sustainability
and Recycling of Adhesives Applications

Applications of adhesives in plastic packaging

Today's focus is on plastics packaging

- Adhesives are used in very many applications and on many substrates
 - Metal
 - Wood
 - Paper
 - Glass
 - **Plastics**
- Many industries use adhesives
 - Industrial manufacture
 - Craftsmen & construction
 - Home, Do It Yourself and school
 - **Packaging industry**



Why a focus on plastic packaging recycling?

- Plastic packaging is high volume
 - 40% of 50 mio tonnes / year of EU plastics demand is used for packaging
- Collection is already in place
 - Separate curbside collection schemes
- Recycling rates are still low
 - Compared to paper, metal, glass
- Impact of adhesives is more pronounced
 - Metal and glass remelting generally not affected by adhesives
 - Paper recycling has developed adhesive removal techniques



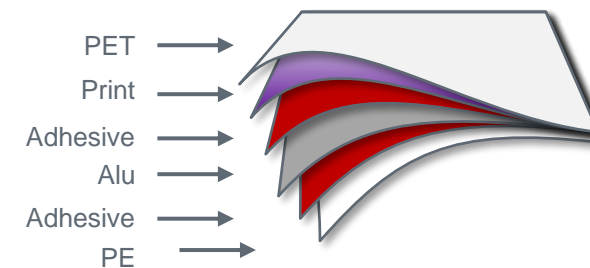
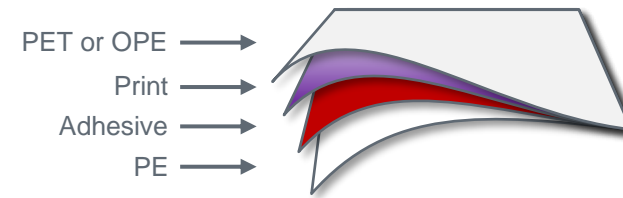
Adhesive uses in plastic packaging

- **Multilayer film production**
 - Laminating adhesives
- **Closure applications**
 - Heat seal
 - Cold seal
 - Pressure sensitive applications
- **Labeling applications**
 - Wet / water-based labeling
 - Hotmelt labeling
 - Pressure sensitive applications

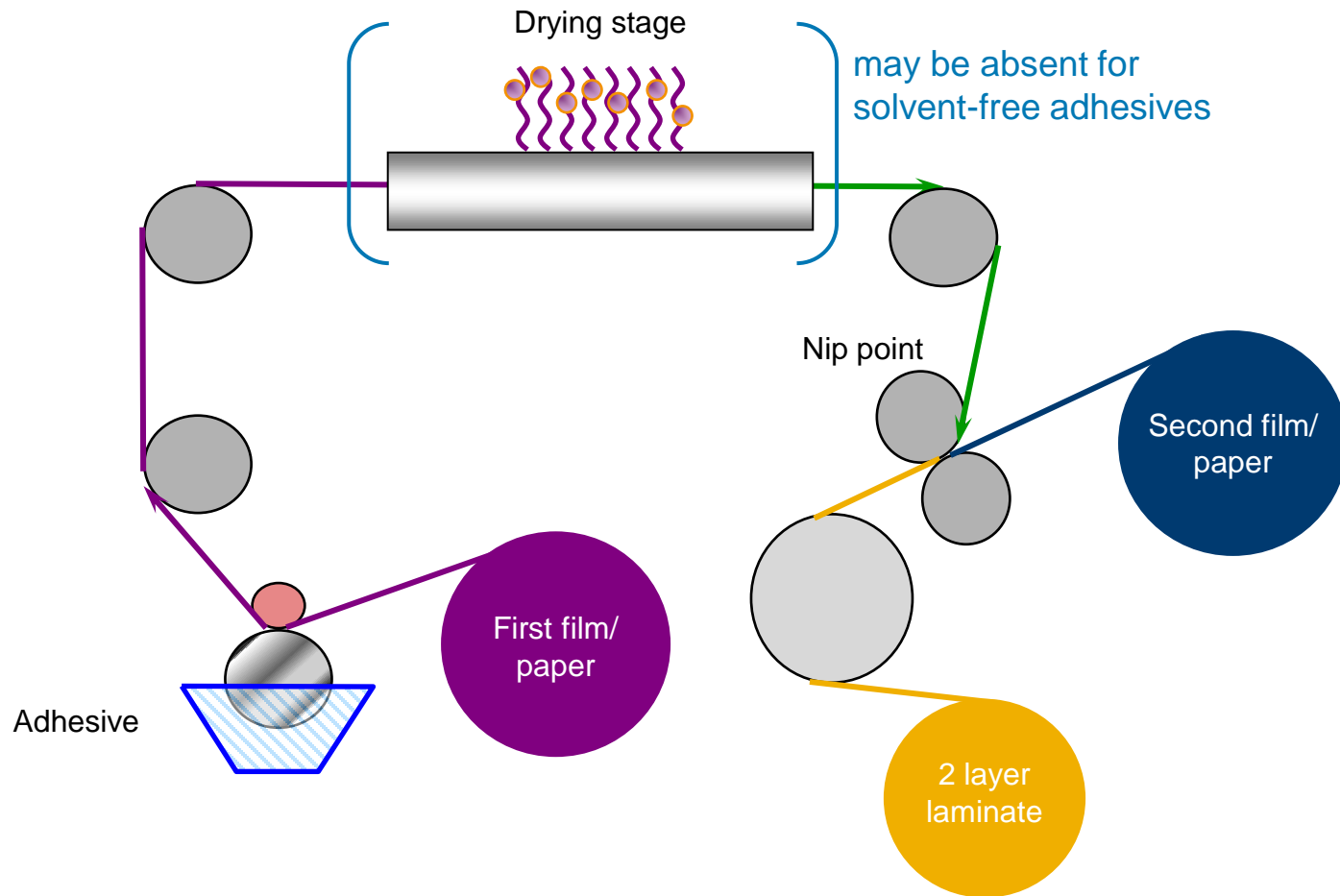


Laminating adhesives

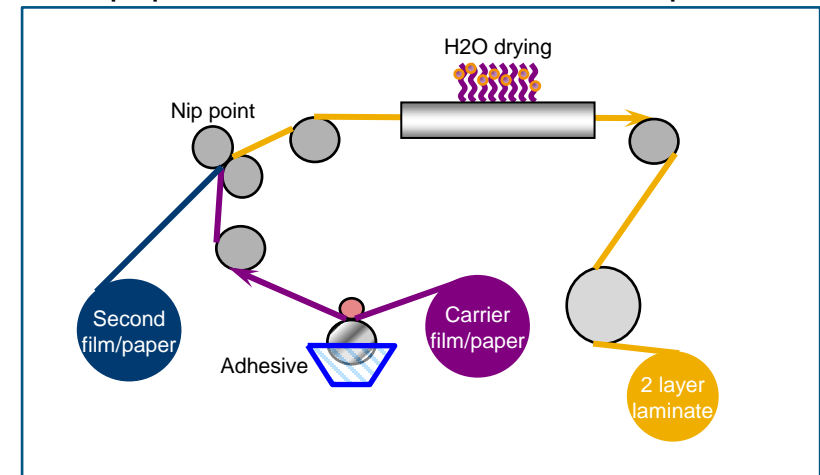
- Used to combine different films into one packaging material
- Improvement of properties such as mechanical resistance and barrier
- Food and non-food applications
 - Pouches
 - Stand up pouches
 - Certain wrappers
 - Medical/pharmaceutical packs



The laminating process



For paper, "wet bond" lamination also possible



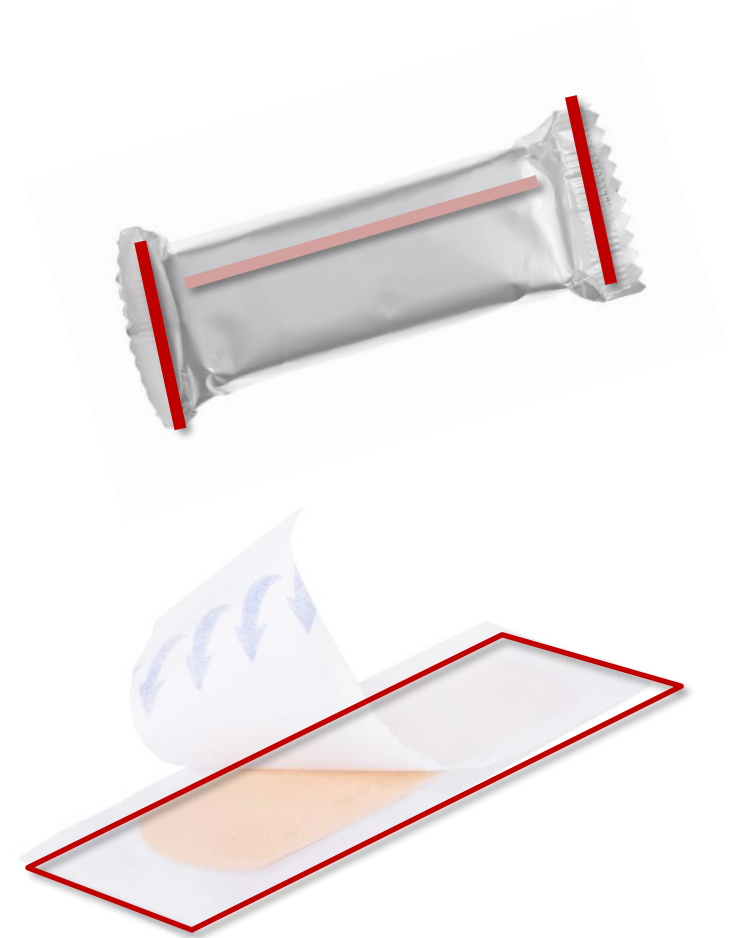
Heat seal

- Ensures hygienic seal and allows for easy peel (easy access)
- Main use is for lidding applications but also used for overwrap applications
- Mainly food packaging
 - Dairy lidding
 - Convenience food tray lidding
 - Hygienic seals on bottles



Cold seal

- Ensures hygienic seal and allows for easy peel (easy access)
- Ideal for temperature sensitive filling goods and high-speed lines
- Food and non-food applications
 - Chocolate bar wrappers
 - Ice cream pouches
 - Medical plasters and other medical packaging
 - Collecting card packs

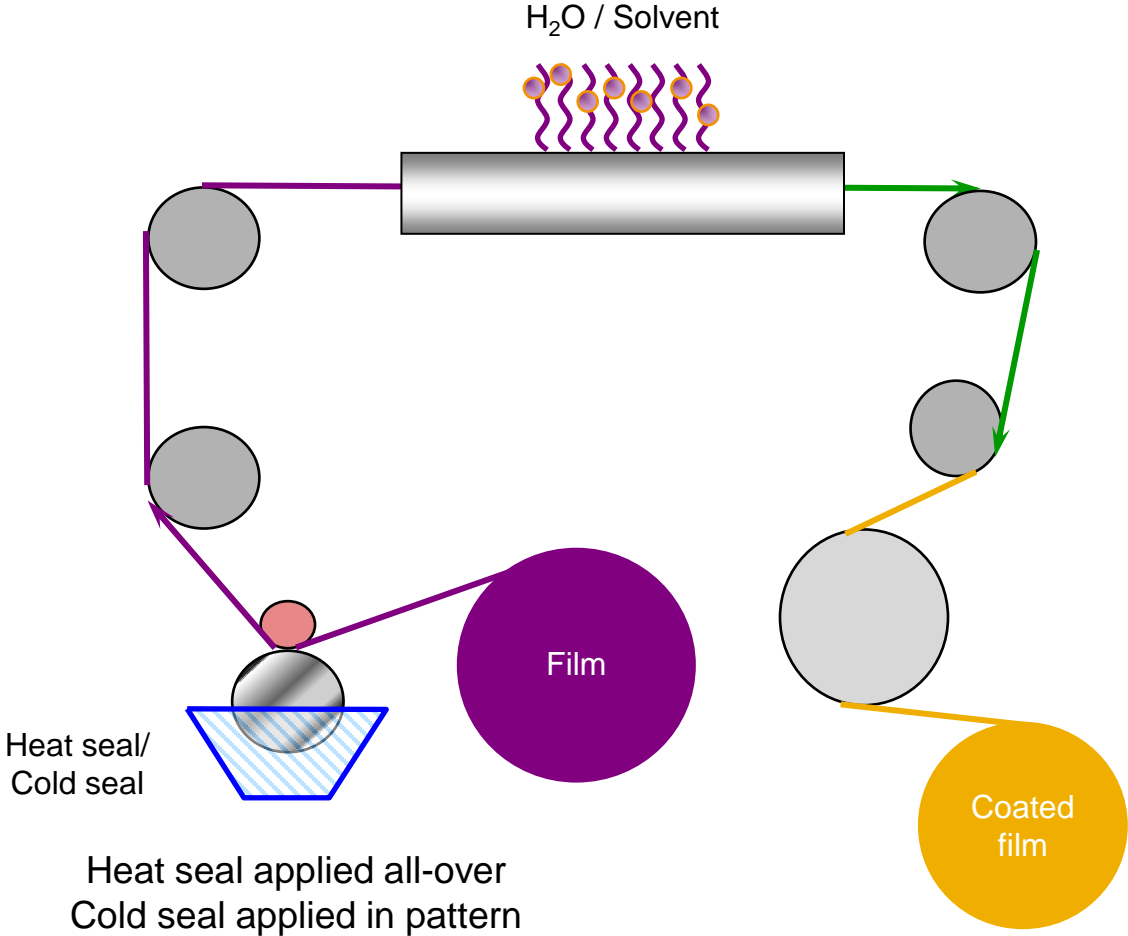


Pressure sensitive reclose applications

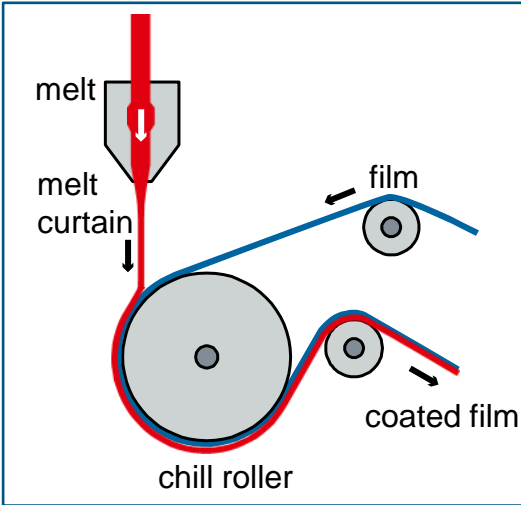
- Ensures hygienic seal and allows for easy peel (easy access)
- Can help to prevent food loss through reclosability
- Food applications
 - Cheese
 - Cold cuts



Heat seal / cold seal application process



In special cases, heat seals can be applied from melt



Wet labeling

- Used to attach paper labels to containers and bottles
- Porous paper face stock allows for wash-off at relatively mild conditions
- Main applications for food
 - Reusable water bottles
 - Reusable soda bottles
 - Dairy packaging



Hotmelt labeling

- Used to attach labels on high volume food production lines
- Wash-off functions firmly established for reusable and recyclable PET bottles
- Food and non-food applications
 - Water bottles
 - Soda bottles
 - Dairy bottles and cups
 - Household products in round bottles



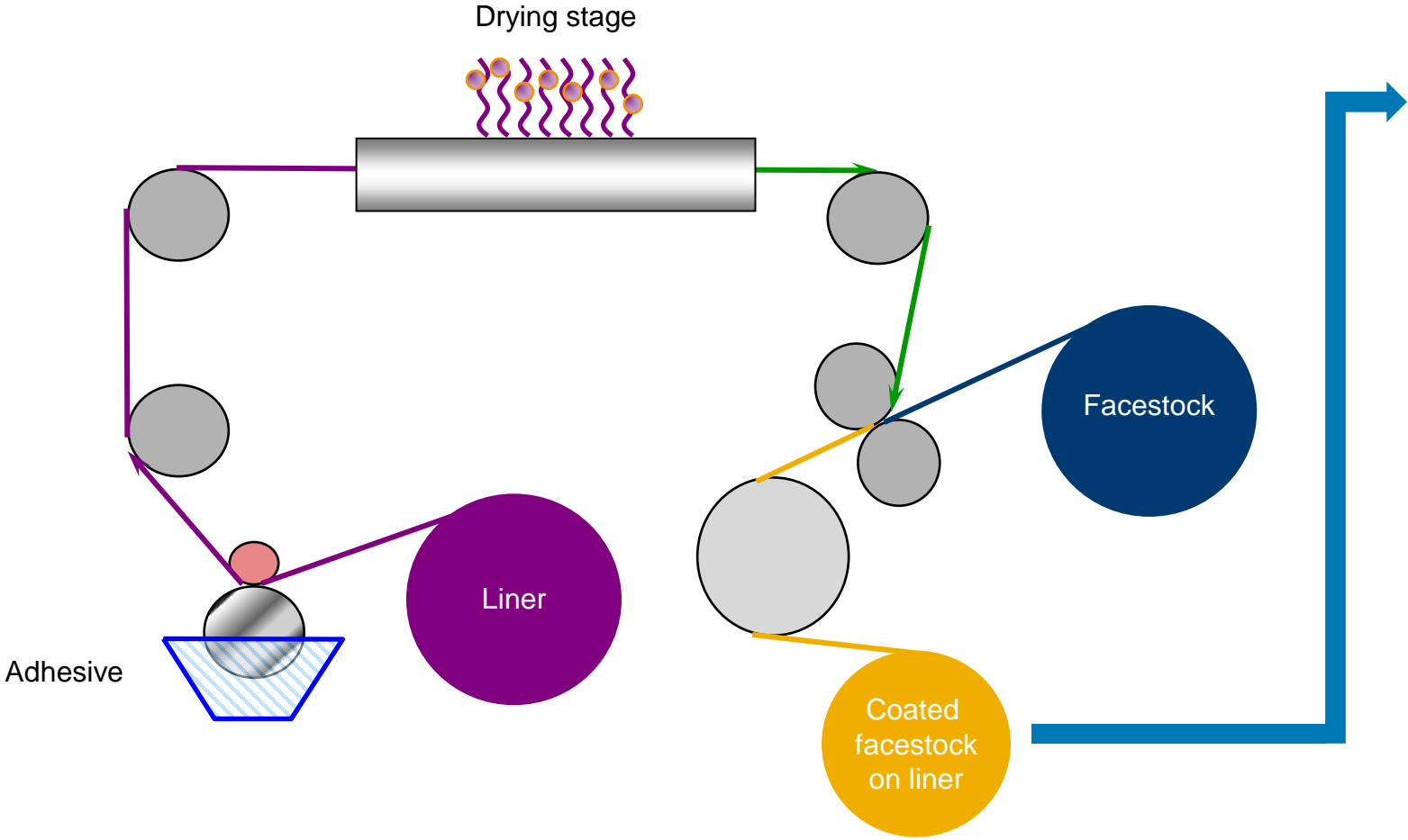
Pressure sensitive self-adhesive labels

- Pressure-sensitive adhesives are used to create self-adhesive labels
- Labels are supplied to the labeling machine and applied just by pressure
- Wide range of applications
 - Container labeling for food and household products
 - Logistics labels (shrink hoods, pallet wrap, secondary/tertiary packaging)
 - RFID* and other tags



* Radio frequency identification

Pressure sensitive label production



Side note: industrial and chemical packaging

- Similar principles apply as for consumer and commercial packaging
- Adhesive labeling also common
 - However, labels typically required to resist adverse environments
- Collection differs markedly
 - Some used/contaminated packaging considered as hazardous goods
 - Product residues can be problematic for recyclers
 - Often excluded from home collection





Dr. Silvio Bassi

Regulatory Manager, COIM and Chair, FEICA Task Force on the Sustainability and Recycling of Adhesives Applications

A group of people are gathered around a large green board with a white recycling symbol. They appear to be in a meeting or workshop, looking at the board and discussing it. The background is a blurred office setting.

Types of adhesives chemistries relevant to plastic packaging

Adhesives – Chemical nature

- What are adhesives?



Adhesives – Chemical nature

- Adhesives are chemicals which hold together things, and enable our life as we know it, in many ways. Today we will focus on the chemistry of some of them, as they are part of the recycling process of many articles that we use in our every day's life...
- Their chemistry is fascinating, because they can be very different!
- But, even more important, they must be fit for the purpose.



Adhesives – Chemical nature

- But let's speak about their chemical nature.

Just for sake of making some examples, without pretending to be exhaustive I can mention to you some classes of adhesives used in different domains:

- Polyurethanes (Lamination adhesives)
- Hot melts (Paper and boards)
- Reactive hot melts (Labels)
- Etc.

Adhesives – Chemical nature

- Basically almost all of them are not soluble in water, also if warm or basic.
- As matter of fact we cannot pretend that one day they hold together, in a good and tight way, different materials and that the day after they will detach from substrate cleanly and in an easy way.
- So, we are confronted with a problem

Adhesives – Chemical nature

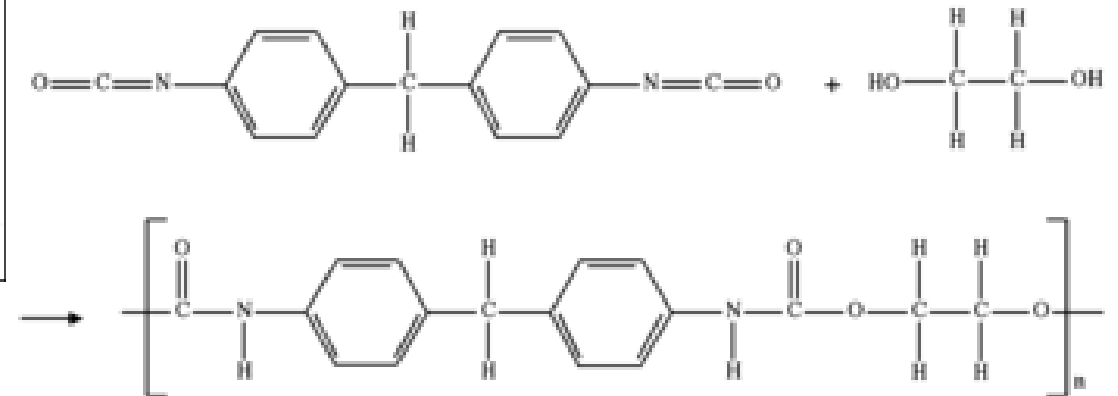
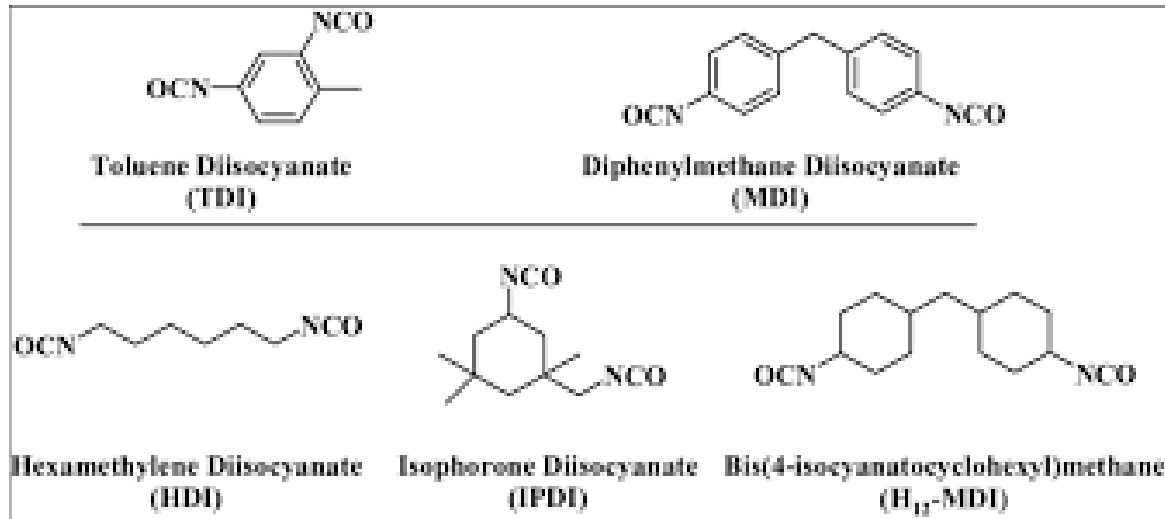
- But let's begin our tour ...



Adhesives – Chemical nature

- Polyurethanes

- Polyurethanes are synthesized starting from diisocyanates and hydroxylated compounds. Hereunder some examples...



Adhesives – Chemical nature

- Polyurethanes
 - Their chemical nature makes difficult an hydrolysis in mild conditions, and so very unlikely that they can be easily removed from plastic films or other substrates
 - What can be achieved is that they will stay together with the substrate at which they are bound



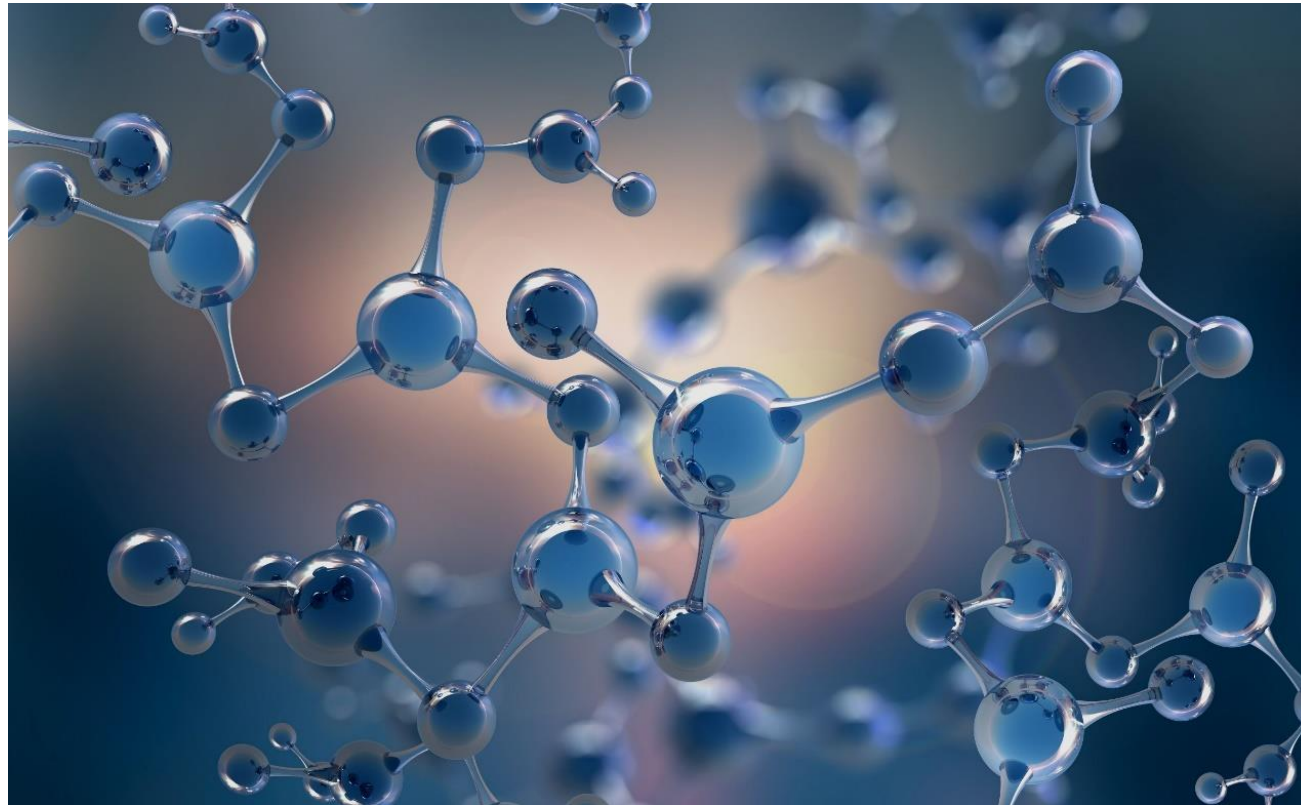
Adhesives – Chemical nature

- Hot melts
 - Hot melts are grouped together because they share the property to be fluid (and thus applied) at high temperature, being solid at room temperature



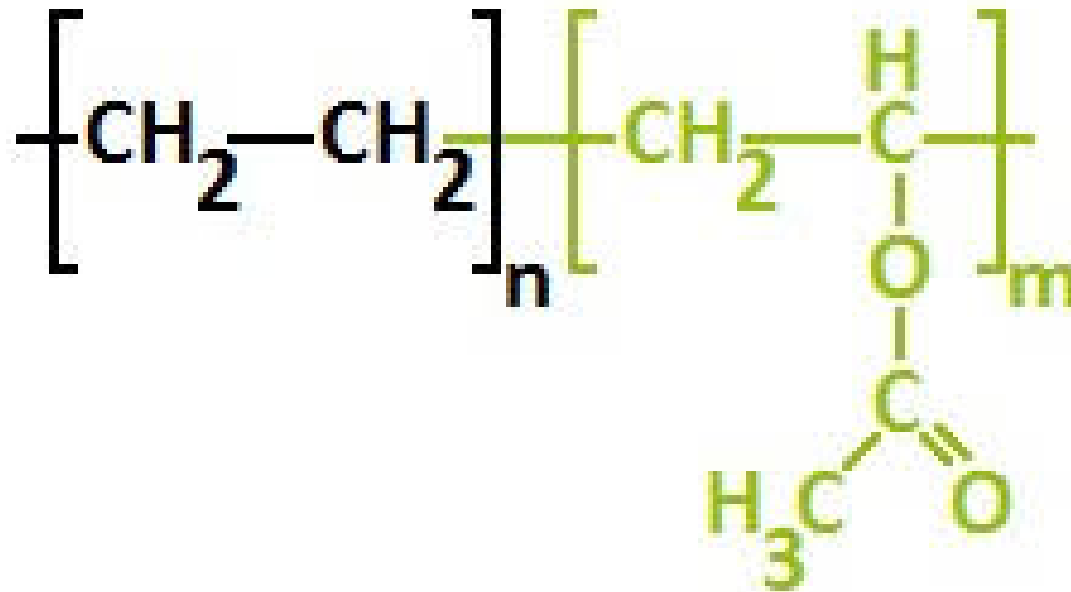
Adhesives – Chemical nature

- Hot melts
 - Hot melts can be of different chemical nature, but all of them are polymers..



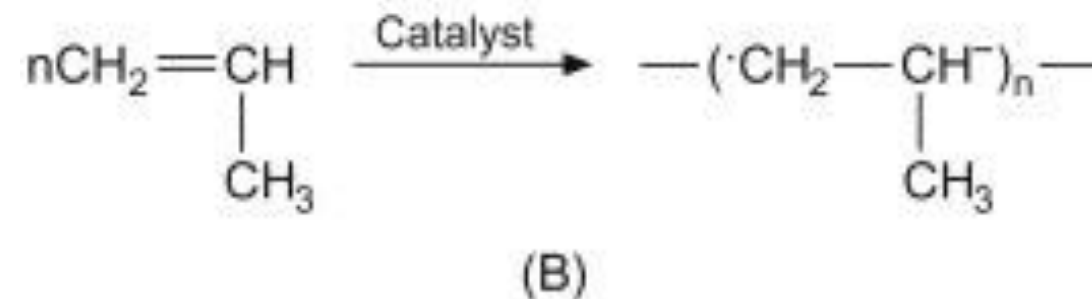
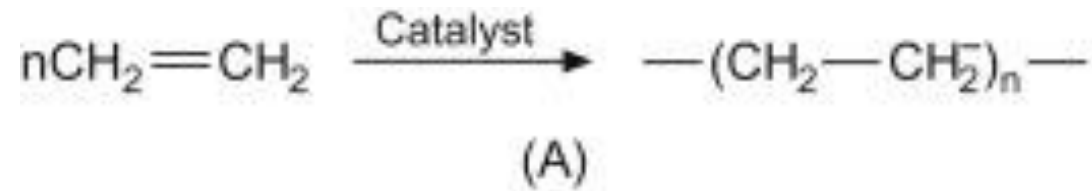
Adhesives – Chemical nature

- Hot melts 01
 - Ethylene vinyl acetates
 - Most frequently used base polymer



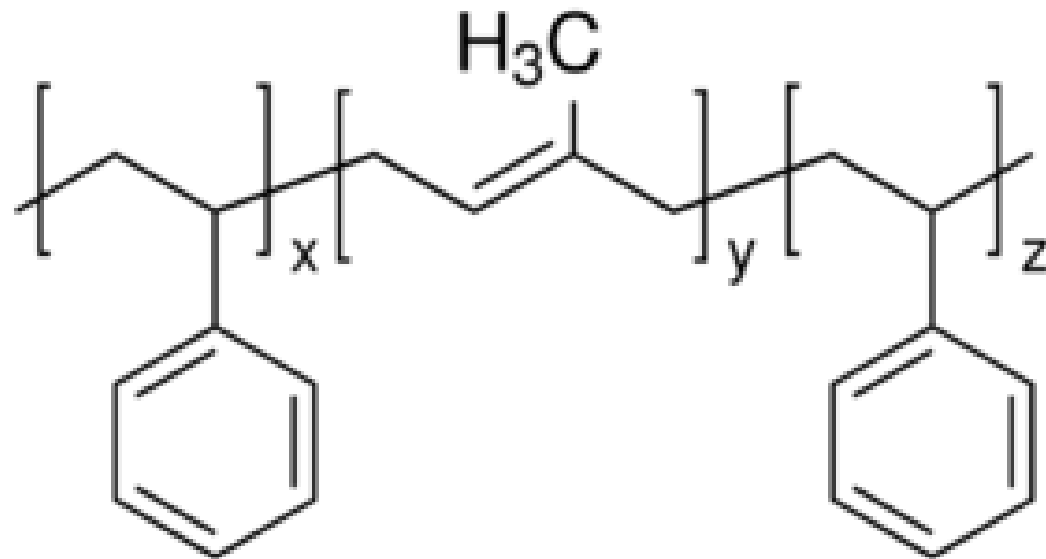
Adhesives – Chemical nature

- Hot melts 02
 - Polyolefins (oriented or amorphous)
 - Good, general purpose adhesives



Adhesives – Chemical nature

- Hot melts 03
 - Styrene block copolymers
 - If low temperature flexibility is required



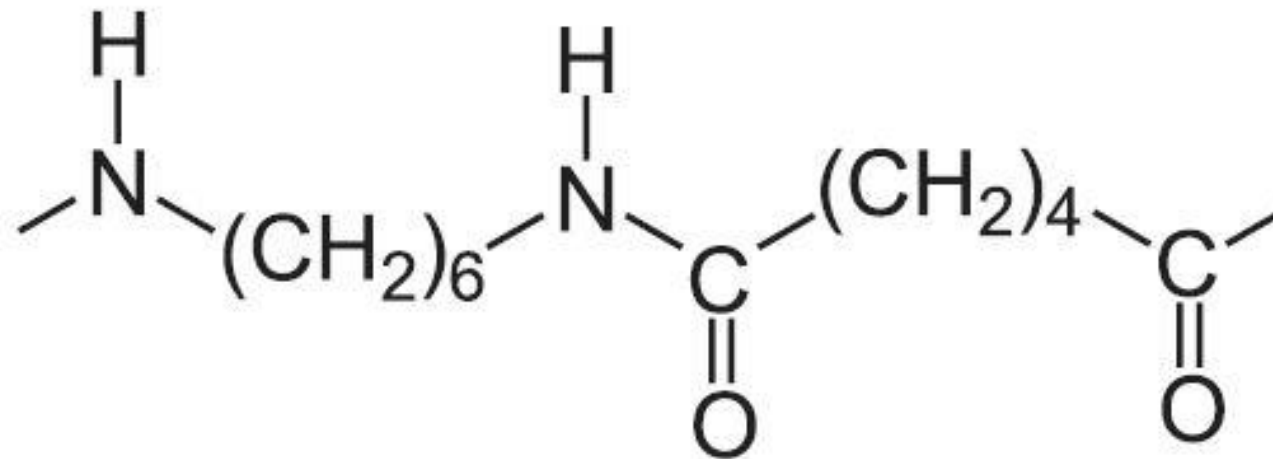
Adhesives – Chemical nature

- Hot melts 04
 - Metallocene Polyolefins
 - Wider temperature range than EVA



Adhesives – Chemical nature

- Hot melts 05
 - Polyamides
 - Considered to be high performance hot melts



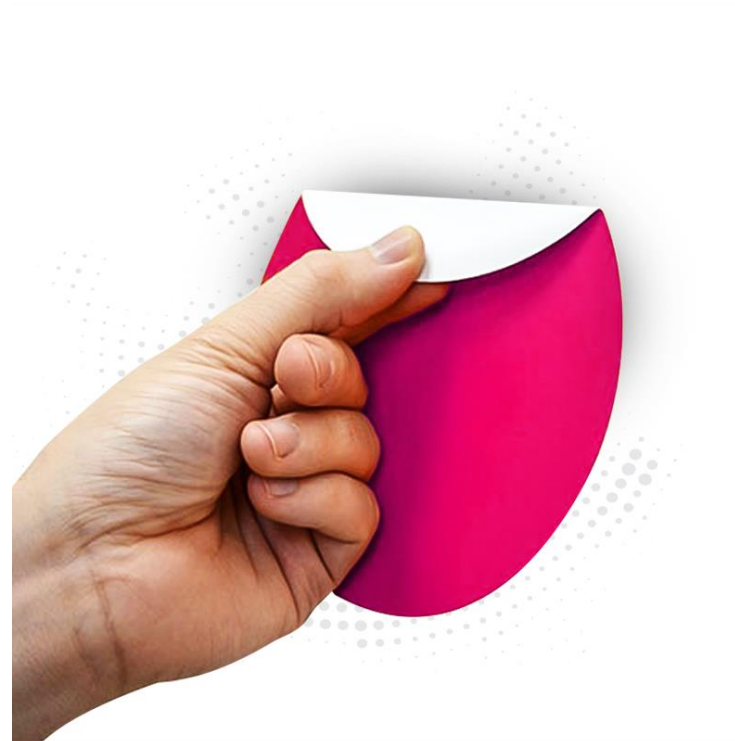
Adhesives – Chemical nature

- Hot melts 06
 - Polyurethanes
 - Reactive hot melts



Adhesives – Chemical nature

- Hot melts
 - Also for all classes of hot melts we have seen, a solubility is difficult to imagine in water at ordinary temperatures. What can be achieved, as said in the first presentation, is the fact that they stay together with their substrate





Jana Cohrs

Executive Director Regulatory Affairs, FEICA

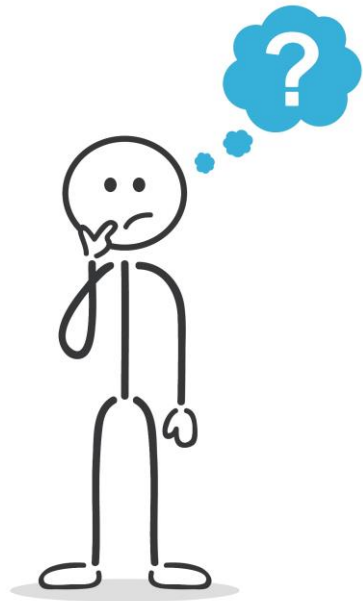
A photograph showing a group of people in a meeting or workshop. They are gathered around a table, looking at a large green sheet of paper with a white recycling symbol (three chasing arrows) in the center. The scene is brightly lit, and the people appear to be engaged in a collaborative activity.

Terminology and definitions to be used when communicating on adhesives

Relevant characteristics of adhesives in the plastic recycling process

There are many different chemistries and application methods of adhesives in plastics packaging and each class of adhesive has its own behaviour

However, regardless of the chemistry or method of application, adhesive applications in recyclable plastic packaging (whether used in the packaging itself or on the label) must possess certain characteristics to ensure they do not interfere with the recycling process under consideration.



Chemistry / Function	Labelling	Pressure sensitive application	Lamination	Cold seal	Heat seal
Polyurethane			X		
Acrylic resin dispersion / emulsion	X	X	X	X	X
Natural polymer-based adhesives	X			X	
Polyolefin / EVA hotmelt	X	X			X
Non-reactive solvent-based adhesives					X

Table 1: Correlation between adhesive chemistry and function.

Cooperation and communication along the supply chain

- Cooperation and communication along the supply chain is key to define what are the right characteristics that allow optimal recyclability
- Problem: Terminology related to adhesive behavior can differ between value chain actors and create misunderstandings.



➔ We all need to speak one language : harmonization of terminology and definitions

Cooperation and communication along the supply chain

FEICA would like to contribute to establishing a common language and common understanding as regards adhesives in plastic recycling.

- FEICA Document : *Terminology and definitions to be used in the context of plastic packaging recycling*
- FEICA is actively reaching out to stakeholders to support the update of guidelines and the evaluation of recycling options
- FEICA is organizing stakeholder events – like the present webinar



Brussels, 12 February 2021

Terminology and definitions to be used in the context of plastic packaging recycling

FEICA, the Association of the European Adhesive & Sealant Industry, is a multinational association representing the European adhesive and sealant industry. Today's membership stands at 15 National Association Members, 24 Direct Company Members and 19 Affiliate Company Members. The European market for adhesives and sealants is currently worth almost 17 billion euros. With the support of its national associations and several direct and affiliated members, FEICA coordinates, represents and advocates the common interests of our industry throughout Europe. In this regard, FEICA works with all relevant stakeholders to create a mutually beneficial economic and legislative environment.

Contents

Terminology and definitions to be used in the context of plastic packaging recycling	1
Background and objective of the document	3
Classification of adhesives used in plastic packaging.....	3
Adhesive chemistries used in or on plastic packaging	3
1. Polyurethane adhesives.....	3
2. Adhesives based on acrylic resin dispersions / emulsions	3
3. Adhesives based on natural polymers.....	3
4. Polyolefin- / EVA-based hotmelt adhesives.....	4
Functions of adhesives in or on plastic packaging	4
1. Labelling (not self-adhesive)	4
2. Pressure sensitive applications.....	4
3. Lamination.....	4
4. Cold seal	4
5. Heat seal	5
Relevant characteristics of adhesives in the plastic recycling process.....	5
Water-soluble / alkali-soluble adhesive application	6
Contact.....	6

Definitions related to adhesives in plastic recycling

Water-soluble / alkali-soluble adhesive application

Any applied adhesive capable of dissolving in water or alkali in the recycling process.

The dissolved adhesive is transferred into the process water and remains in solution until the washing liquid undergoes a recovery or cleaning step.



Definitions related to adhesives in plastic recycling

Releasable adhesive application

Any applied adhesive capable of releasing on at least one side of its bond under the specified conditions in the recycling process.

After releasing, the adhesive remains on one or on both substrates. The process water does not accumulate adhesives (it is not recommended to recycle the washing solution).

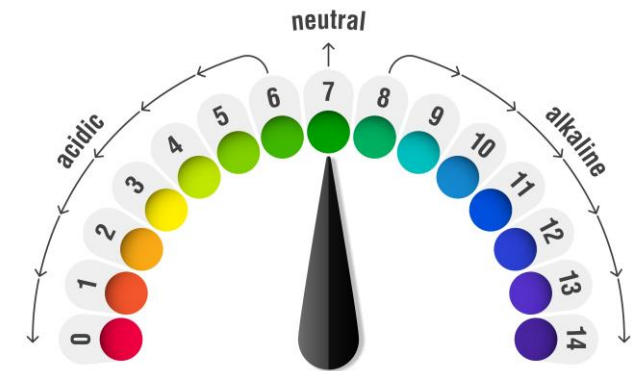


Definitions related to adhesives in plastic recycling



- **Water releasable:** any applied adhesive capable of releasing on at least one side of its bond in water under the specified conditions in the recycling process.

- **Alkali releasable:** any applied adhesive capable of releasing on at least one side of its bond in alkali under the specified conditions in the recycling process.



Let us work together
and boost the circular economy !



Q&A

- Please use the chat box if you have a question
- Questions in the chat box will be covered as we go along



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FEICA Task Force on the Sustainability
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