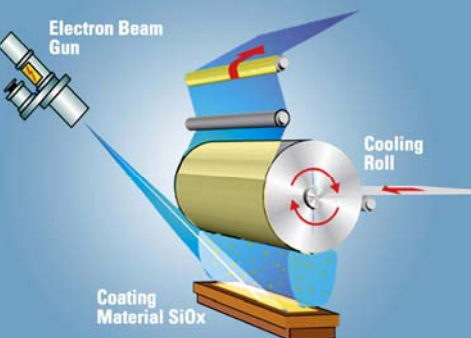




TAPPI 11th European PLACE Conference

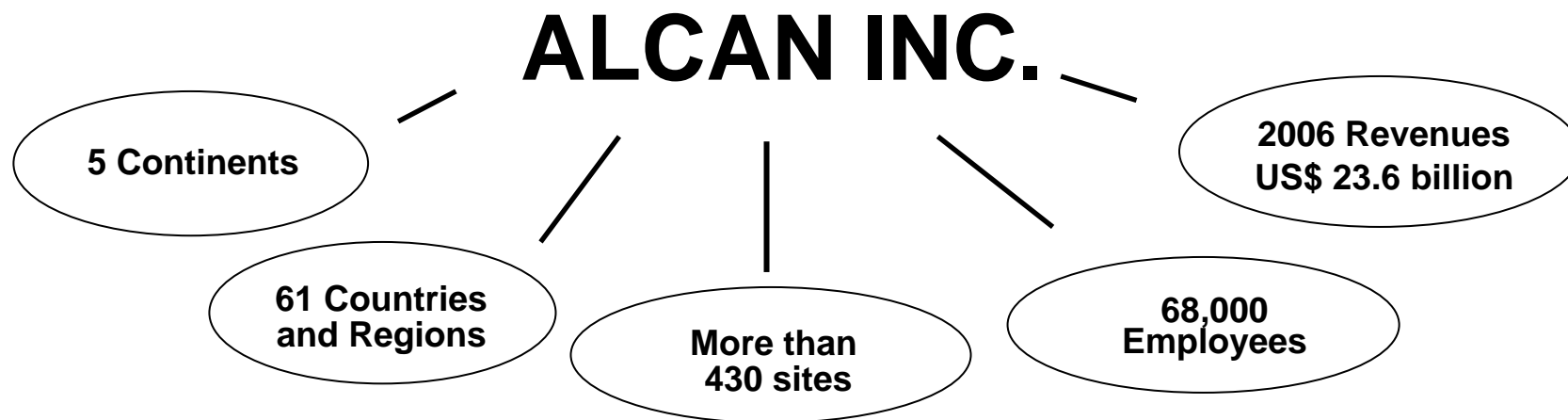
Transparent Inorganic Barrier Films

Thomas Glaw / Sales Manager CERAMIS®
Alcan Packaging Kreuzlingen / Switzerland





Alcan Inc. at a glance



- > A powerful synergy of people, products, technology and potential.
- > A balanced presence in all of the world's major markets.
- > A modern asset base, top-flight technology and plenty of room for growth.
- > Demonstrated ability to deliver on our commitments.
- > Supplier of raw materials – bauxite, alumina and aluminum – and a producer of finished products – engineered and packaging
- > Leading advocate for sustainability in business as the key to value creation and long-term growth



A leading position in our core markets

BAUXITE AND ALUMINA

US\$1.8 B Sales* - 4,700 Employees**



PRIMARY METAL

US\$8.7 B Sales* – 16,000 Employees**



PACKAGING

US\$6.0 B Sales* – 31,000 Employees**

**Third party sales and operating revenues*



ENGINEERED PRODUCTS

US\$7.1 B Sales* – 15,000 Employees**

***Including joint ventures*



Global Presence

- Bauxite and Alumina
- Primary Metal
- Engineered Products
- Packaging
- Corporate
- R&D





Packaging

31,000 employees in 35 countries and regions– 130 production facilities

Products

- Transformation of a wide range of flexible and rigid materials (plastics, engineered film, aluminum, paper, paperboard) into customer-branded products

Markets

- Food and beverage
- Beauty and personal care
- Pharmaceutical and medical
- Tobacco

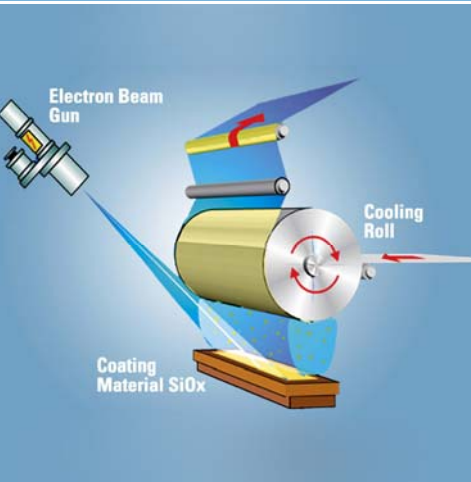
Highlights

- World-leading positions in major business sectors:
 - #1 in food flexible, pharmaceutical and beauty
 - #2 in tobacco packaging
- Improved ability to serve multinational customers through size and scale
- Increased number of operations in emerging markets (Eastern Europe, China, Malaysia, Russia)



Alcan Packaging Kreuzlingen

CERAMIS®





Content:

- Different Coating Techniques
- Business Unit CERAMIS®
- Properties of CERAMIS®
- CERAMIS® Film Grade
- Barrier Films
- PLA-SiOx



Different Coating Techniques

For the Production of Transparent Barrier Films by Thin-Layer Technology

- **Re-active Evaporation of Aluminium**
⇒ „AlOx“
- **Plasma CVD**
⇒ „SiO₂“ or Hydrocarbon Layers
- **EB-Evaporation of SiOx**
⇒ „SiOx“
- **Re-active EB-Evaporation of Aluminium**
⇒ „AlOx“
- **Thermal Evaporation of SiOx**
⇒ „SiOx“



Re-Active Evaporation of Aluminium

System applied by:

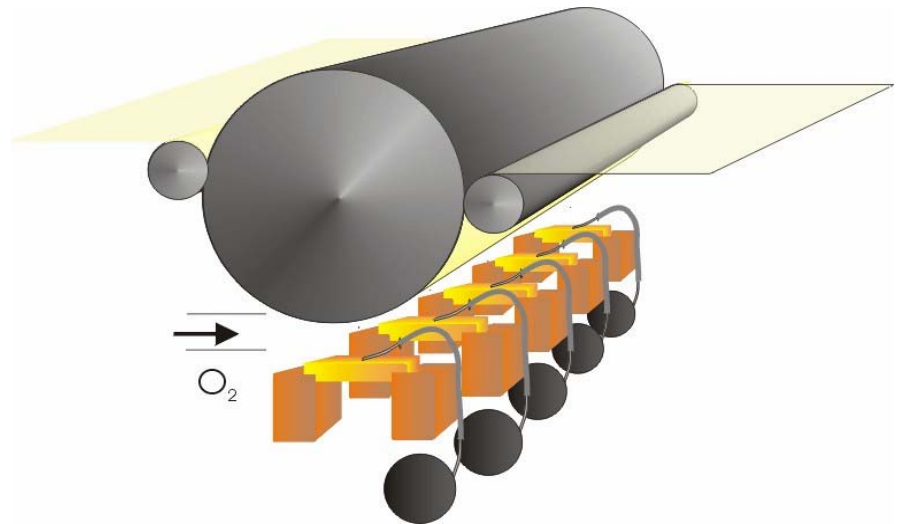
- Amcor (Camvac)

Advantages:

- Low material costs
- No yellow tint
- High productivity
- Low investment

Disadvantages:

- Process difficult to control
- Layer sensitive to elongation
- Medium barrier properties





Plasma CVD

System applied by:

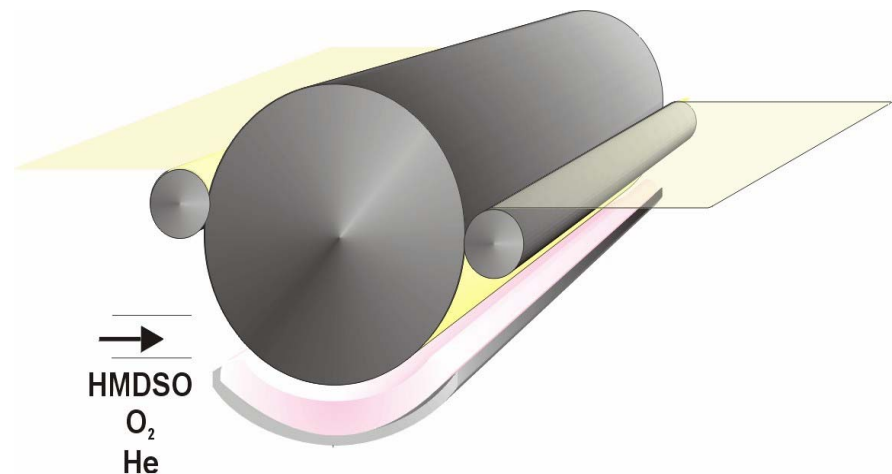
- Tetra Pak (SiO_2)
- Dai Nippon Printing (SiO_2)
- Amcor (AuR) (Hydrocarbon-Layers)

Advantages:

- Low material costs
- No yellow tint

Disadvantages:

- High investment
- Low productivity





EB - Evaporation of Silicon Oxide

System applied by:

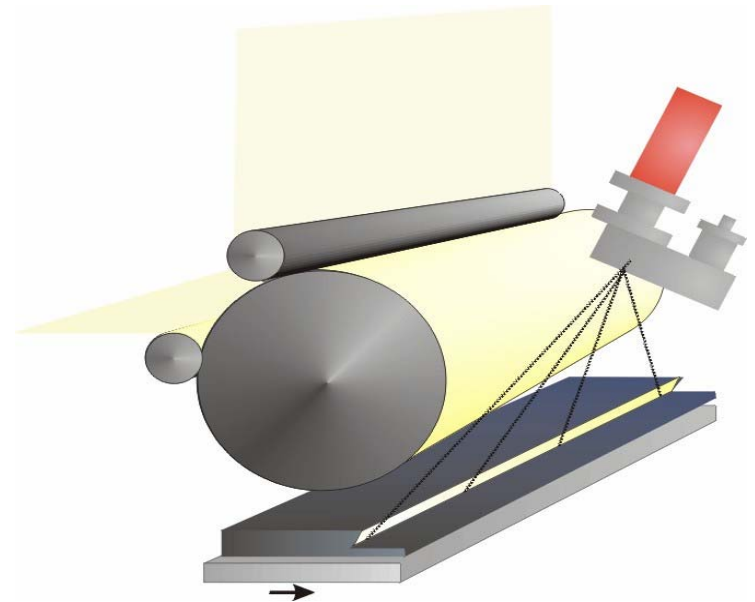
- Alcan Packaging
- Oike (JP)
- Toyobo (Co-Evaporation of $\text{SiO}_2/\text{Al}_2\text{O}_3$)

Advantage:

- Low material costs
- No yellow tint
- High productivity
- Good barrier properties
- High mechanical resistance

Disadvantage:

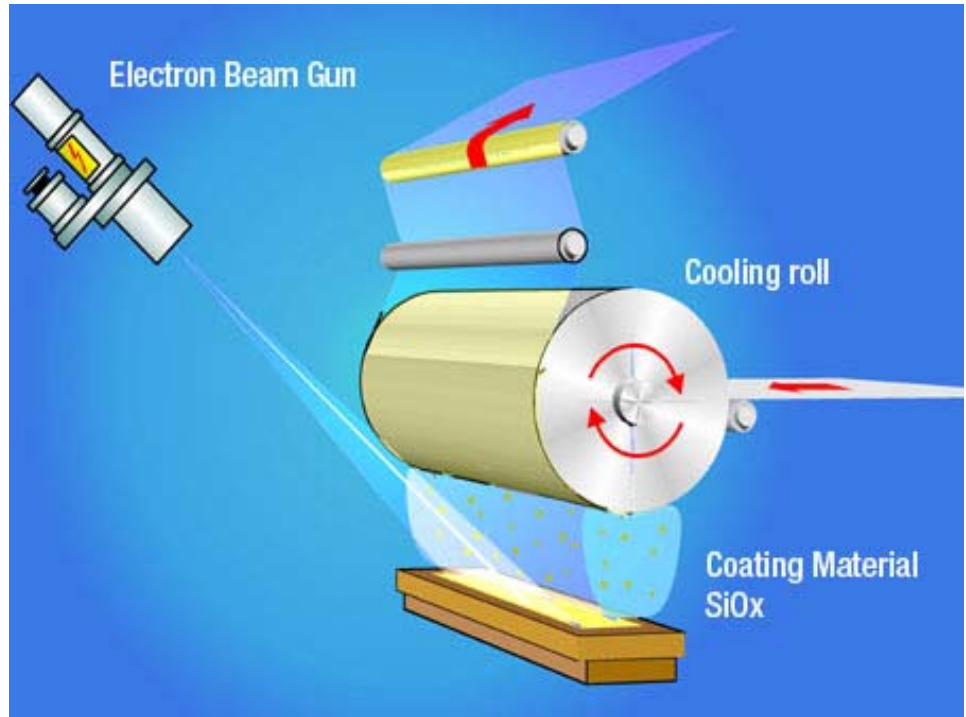
- High investment





Electron Beam Evaporation of Silicon Oxide

The electron beam evaporation allows a controlled and constant evaporation of the coating material.





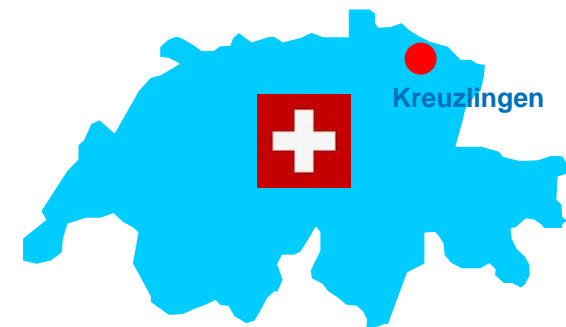
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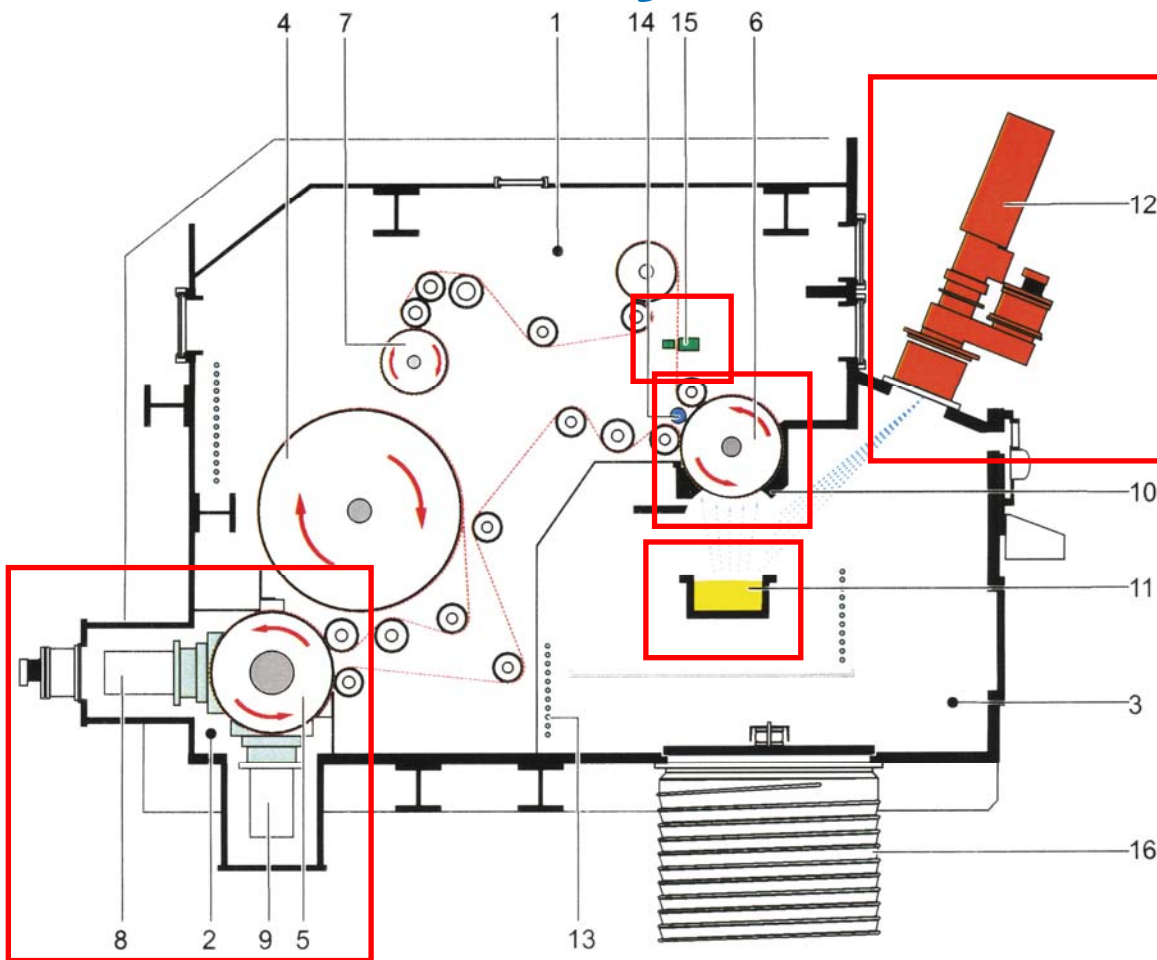
Business Unit CERAMIS®

- Part of Alcan, a global leader in aluminium and packaging
- Located in Switzerland
- Specialized facility for high barrier films
- Most modern production equipment
- Annual capacity of more than 100 mio m²





Machine Layout



- 1 Winding Chamber
- 2 Pre-treatment Chamber
- 3 Coating Chamber
- 4 Unwinder
- 5 Pre-treatment drum
- 6 Coating Drum (cooled)
- 7 Rewinder
- 8 Pre-treatment, stage 1
- 9 Pre-treatment, stage 2
- 10 Coating Window
- 11 Crucible
- 12 Electron Gun
- 13 Cooling Trap
- 14 Post treatment
- 15 Layer Monitoring System
- 16 Diffusion Pump



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Properties of CERAMIS®



- Combined high barrier against gas, water vapour and flavours
- Sterilizable and no „retort shock“
- Barrier functions independent from climatic factors (moisture etc.)
- Microwave ability
- Suitable for use in metal detectors
- “water”-clear



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CERAMIS® - Film Grade

all „waterclear“

		Non Retort			Retort		
		MAP Lidding	Pouches	Tubes	Pouches	Lidding	
Product examples		- Sausages - Ham - Pizza - Pasta - Cheese - Snacks	- Instant Drink Powder - Jam - Detergents - Fruit Juices - Ready Meals - Herbs & Spices - Bread	- flow-wrap - biscuits	- Toothpaste - Spread e.g. choco cream - Dressings - Herbs & Spices	- Ready Meals - Enteral Nutrition - pre-cooked products - Fruits - Soups	- Fruits - Ready Meals - Dips/Sauces - Snacks - Soups
CERAMIS® Film							
PET	CPT001	↗	↗		↗		
	CPT002				↗		
	CPT003	↗	↗				
	CPT005				↗	↗	
	CPT006				↗		
	CPT007	↗					
	CPT008	↗					
	oPP	CPP001			↗		
CPP002				↗			
CPP003				↗			
oPA	CPA001	↗	↗				
	CPA002				↗	↗	
PLA	CPN001	↗	↗	↗			



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Barrier Films

- Taylor made grades for various applications
- Pouches - retort and non retort
- Various kinds of liddings
- Modified Atmosphere Packaging “MAP”
- Snacks
- Tubes
- ...





Barrier Materials

	Vacuum Coated Films		PVDC		EVOH
	AlOx	SiOx	Film	Lacquered	
No "Retort Shock"	✓	✓	✓	✓	✗
Moisture Stable Barrier	✓	✓	✓	✓	✗
Retortable	✓*1	✓	✗ ✓	✗ ✓	✗ ✓
Chloride Free	✓	✓	✗	✗	✓
Formable	✗	✗	✓	✗	✓

*1 only with overlacquer



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Bio-plastics: Hype or Trend?

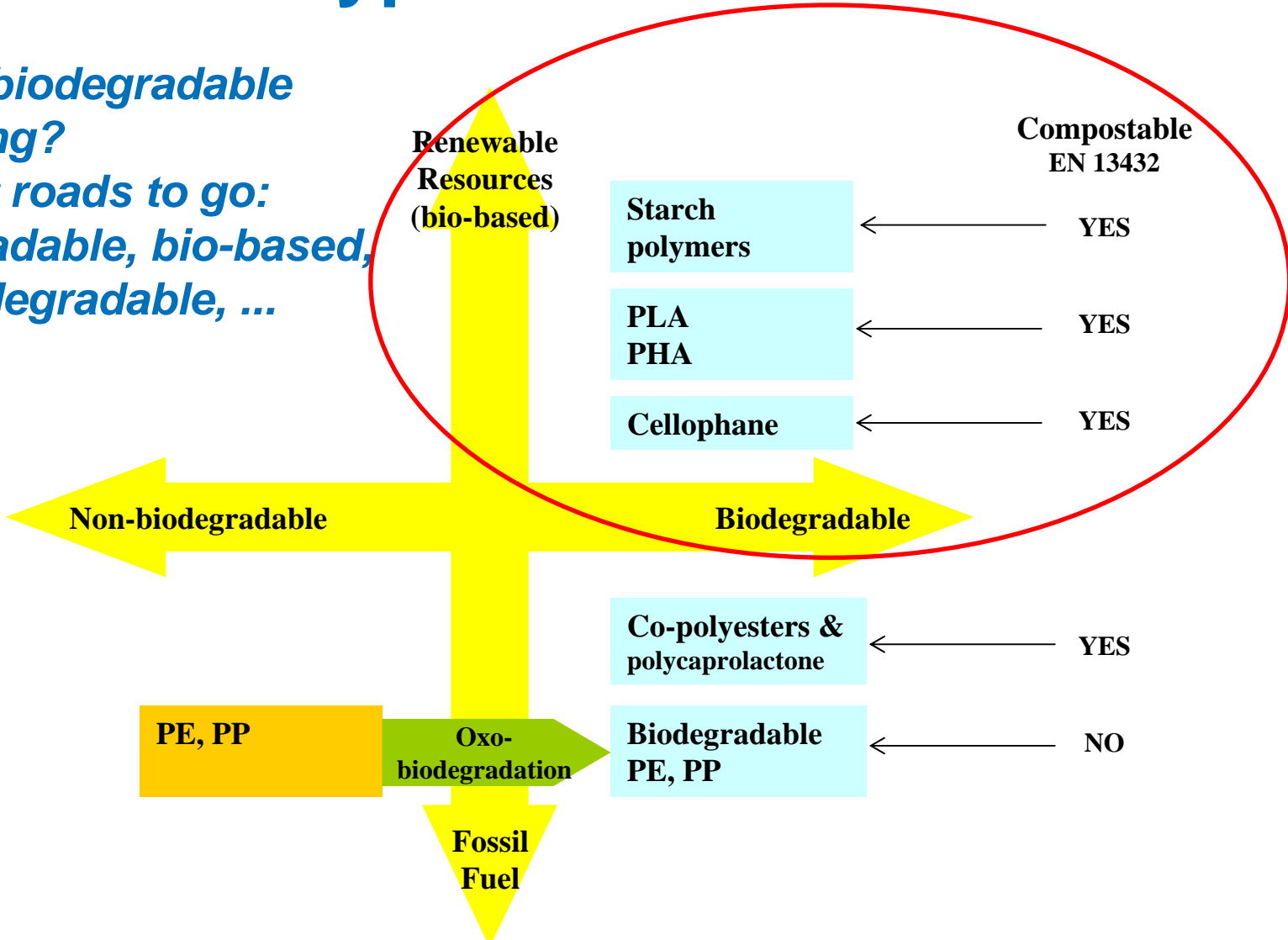
- Bioplastics have been available for many years.
- PLA (Poly Lactic Acid) is an environmentally friendly thermoplastic polymer.
- PLA is made out of annually renewable resources (corn starch).
- Alcan has developed a new barrier film type made from PLA.





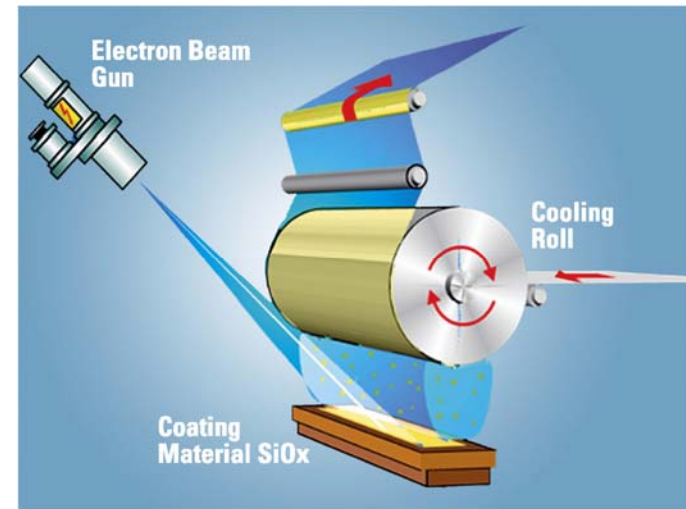
Bioplastics: Hype or Trend?

*What is biodegradable packaging?
Different roads to go:
Biodegradable, bio-based,
oxo-biodegradable, ...*

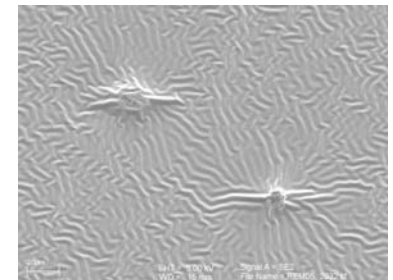


Challenge: To apply a 1520°C coating to a heat sensitive film

- PLA starts to shrink at 60°C.
- High tech plates made out of carbon fibres used for insulation.
- Carbon fibres also used for race-car brakes and Formula 1 cockpits.
- Dwell time of the PLA in the critical hot-zone was reduced.
- Without barrier the use for shelf stable food packaging is impossible.



Unaffected material



Thermally damaged material

PLA-SiOx

- Compared to conventional packaging materials, PLA is made 100% from annually renewable resources and fulfills the idea of sustainability.
- PLA-SiOx is completely biodegradable and compostable.
- CERAMIS[®] PLA-SiOx films are certified by DIN CERTCO and in conformity with DIN EN 13432:2000-12
- They will degrade completely into CO₂ and water.
- Alcan is the first who can offer a fully biodegradable transparent high barrier material made out of annually renewable sources.



Composting








This pictures shows the degradation of Biophan at 55°C in the lab of Treofan. After 8 weeks only small particles of ink are remaining.

Quelle: Treofan

PLA-SiOx

- Compostability certification systems

Organisation	DIN-Certco/ IBAW	AIB Vinçotte	BPI/ USCC	Jätelaito- syhdistys	BPS
Location	Germany	Belgium	USA	Finland	Japan
Logo					
Standard	DIN V 54900 EN 13432 ASTM D6400	EN 13432	ASTM D6400	EN 13432	GreenPLA certification scheme



So why care about biodegradable packaging?

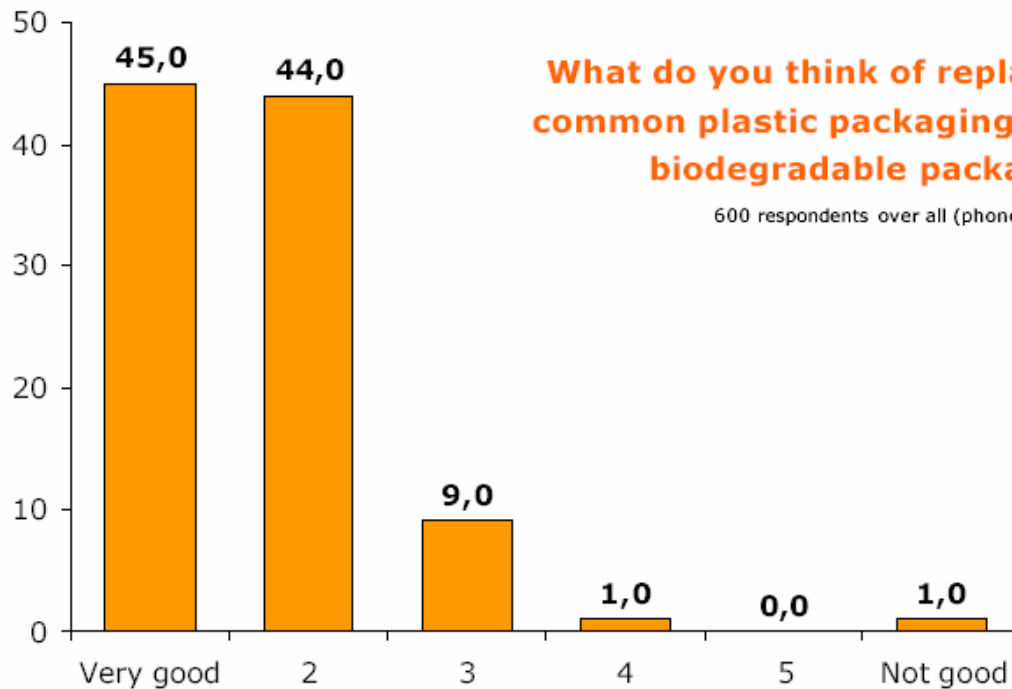
- Customers want it because it meets their sustainability policy.
- Retailers want it because it matches their eco-image, and it works.
- End-users want it because they feel they make the right choice.
- Legislation supports it.
 - German Packaging Directive exempts compostable packaging from Green Dot Fee regulation.
 - CO2 based tax is in discussion everywhere in Europe.
- And last but not least:
 - It is all about new materials, new products, new markets.
 - It is real innovation.



Biodegradability as Marketing Instrument I

Market Research in Kassel 2002: Consumer acceptance

Respondents in %

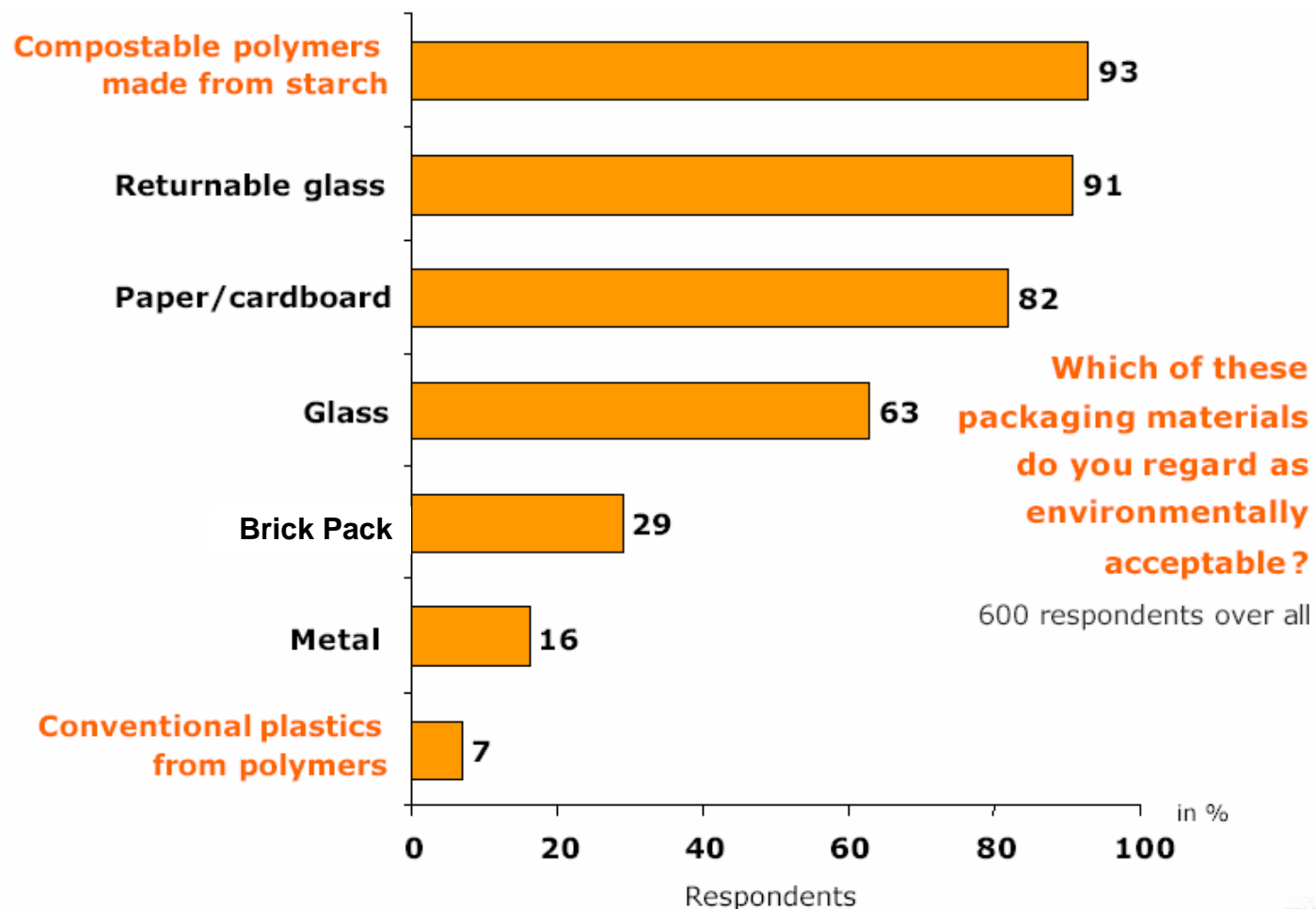


What do you think of replacing common plastic packaging with biodegradable packaging ?

600 respondents over all (phone interviews)



Biodegradability as Marketing Instrument II



PLA Application without Barrier



Bread and Bakery goods

Attractive packaging due to high gloss and transparency

Because of the high WVTR baked goods stay longer fresh and crispy.



Fresh Produce

Biopackaging for bio-products
Products can „breathe“ and stay longer fresh.

The noise gives the impression of freshness.

High gloss and transparency support an attractive packaging.

Sausages and soft cheese

Products that need to ripen or dry

Increasing shelf life

Protection

Good aroma barrier



Twist

Biophan has good twist and deadfold properties.

Because of the high WVTR, the product needs to be protected with an additional packaging.

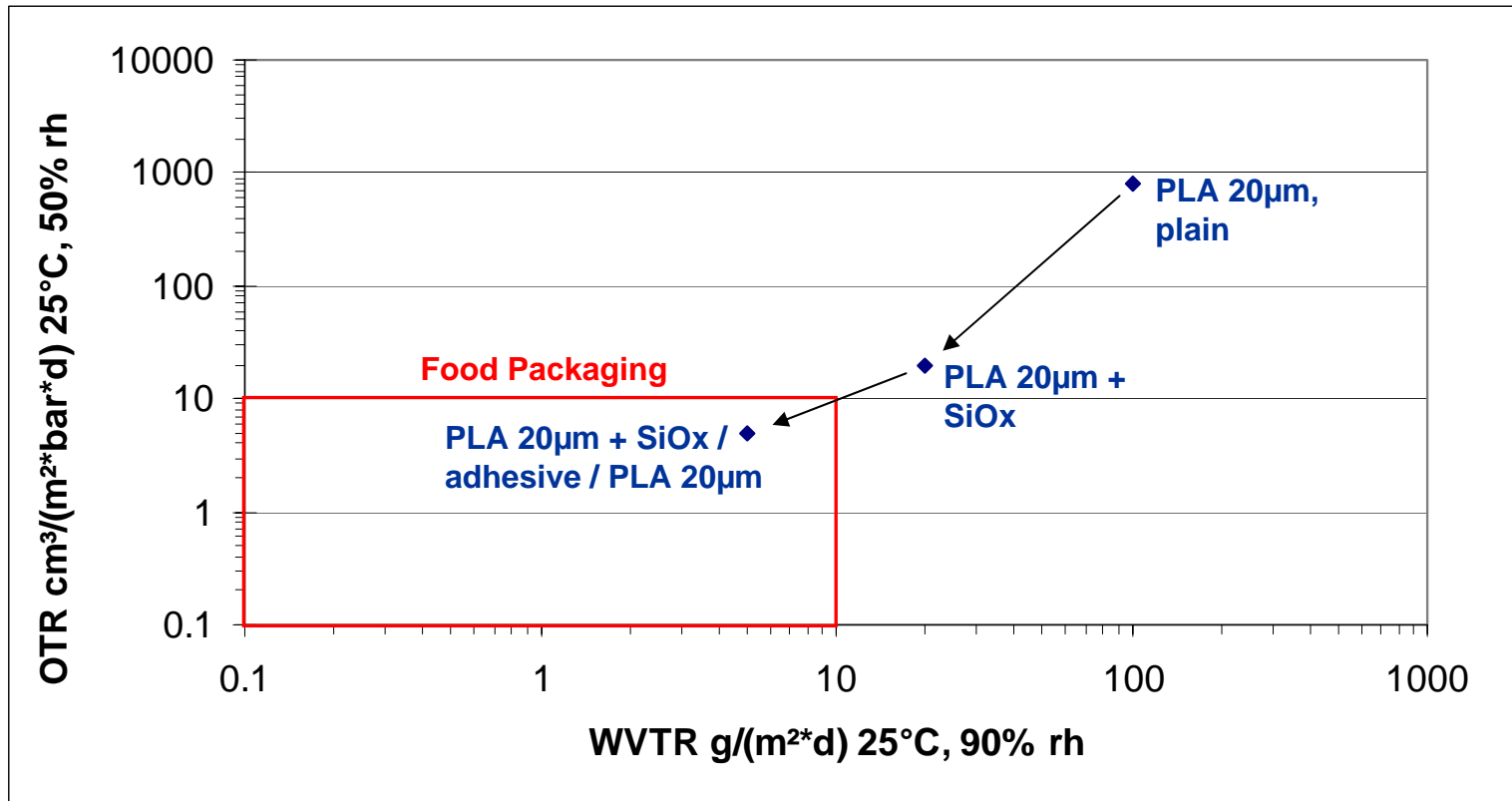


Source: Treofan



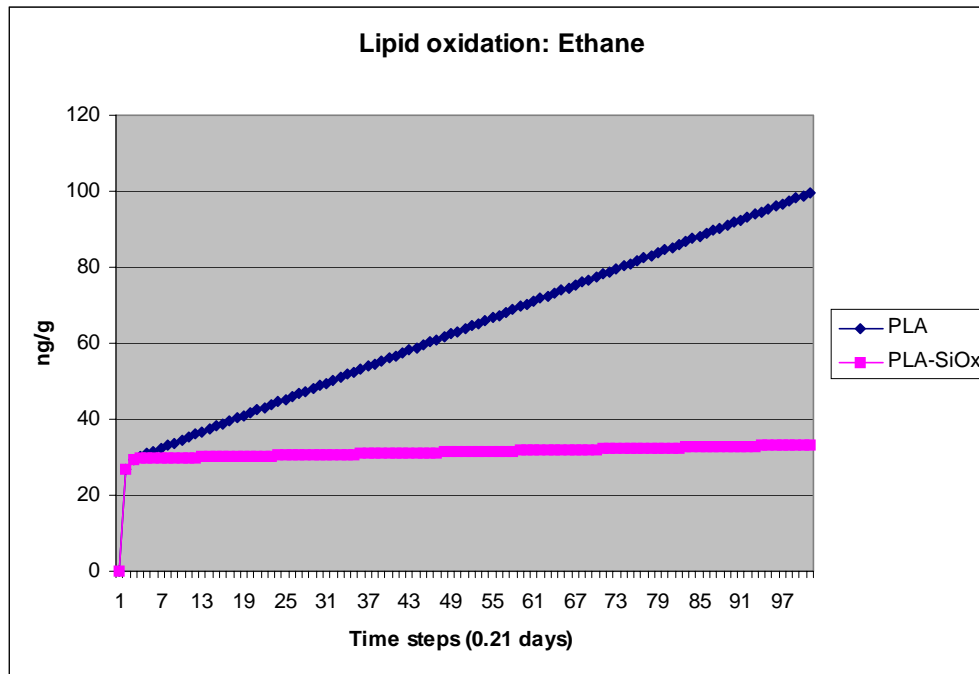
PLA-SiOx

- SiOx coating provides the necessary barrier to use PLA films for food packaging



PLA with Barrier - Product Protection

- „Shelflife Design Programme“ which simulates storage and packaging conditions
- Lipid oxidation limits storage time



Storage conditions:
750g meat
21 days
@ 23°C, 50%rh



One Week Life Excerpt of Meat...



Isn't life beautiful in PLA-SiOx (CERAMIS®) ?

Bio-plastics: Hype or Trend?

- Bioplastics are a clear trend.
- Growing interest in biodegradable films from major food companies and retailers.
- Official legislations will follow.
- Different film grades are available.
- SiOx coating provides necessary barrier.
- OTR < 5 cc/(100in² bar d)
- WVTR < 5 g/(100in² d)





ALCAN PACKAGING



Thank you

For more information please contact me or visit our web page.

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