



Adhesive Lamination Performance - What Really Matters -

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Presented by:
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Barcelona / Munich

MORCHEM
Speciality Adhesives & Coatings

AGENDA:

- COMPANY INTRODUCTION
- MORCHEM ADDING VALUE TO OUR CUSTOMERS
- HIGH SPEED LAMINATION WITH DOUBLE BARRIER STRUCTURES - INTRO
- DIFFICULTY ON LAMINATING DOUBLE BARRIER STRUCTURES WITH SF ADHESIVE
- MORCHEM PROPOSAL
- QUESTIONS

AGENDA:

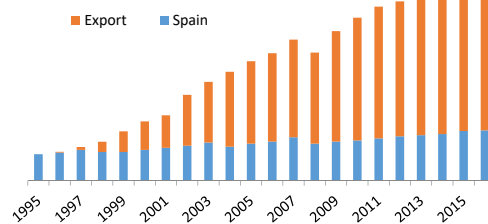
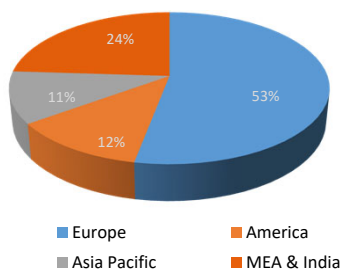
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■	QUESTIONS

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INTRODUCTION

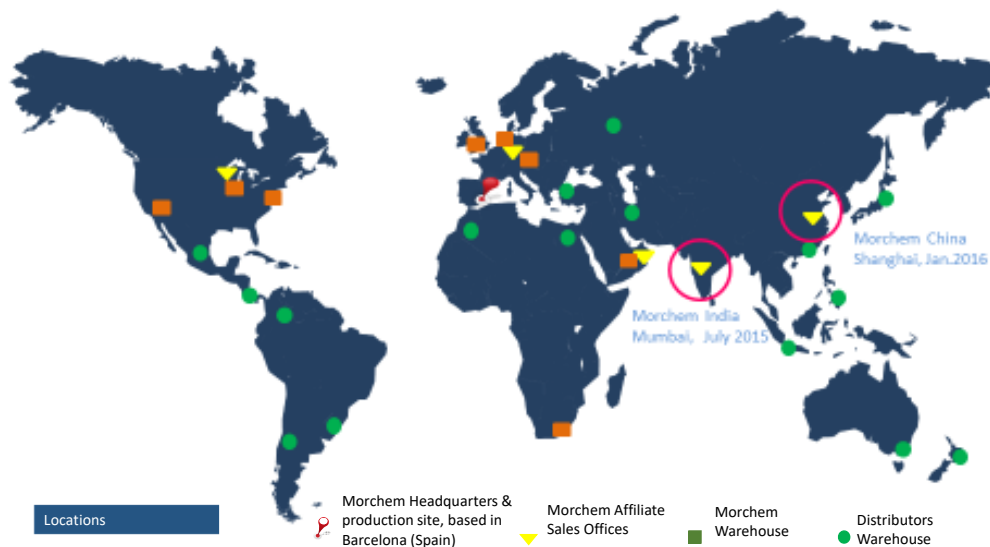
- Private family owned company
- Founded in 1985, with expertise in polyurethanes since 1955
- Headquarters, production, technical + R&D Centre in Barcelona (Spain)
- Employees : 120 (> 30 graduated chemists & engineers)
- Self-financed, with an average yearly investment > 5 % of turnover
- Market leaders in Spain and over 80% sales in export markets

MORCHEM
Speciality Adhesives & Coatings



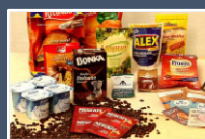
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Our company - Worldwide Presence



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OUR BUSINESS UNITS



Flexible Packaging

Lamin. Adhesives
SF, SB, WB

Functional Coatings
Gloss Lacquers
Heat Seal Coatings
Extrusion & Printing
Primers



Technical Laminates

Lamin. Adhesives
SF, SB, WB

Functional Coatings
Reactive Hotmelts
WB



TPU for Printing Inks

Binders for Gravure
& Flexo Inks

SB, Film Former
SB Modifier
SF P. Plasticizer
WB Film Former



Textile Lamination

SB & reactive
PU Hot melts
Adhesives for
Garment, Lingerie,
Footwear,
Sportswear,
Automotive,...

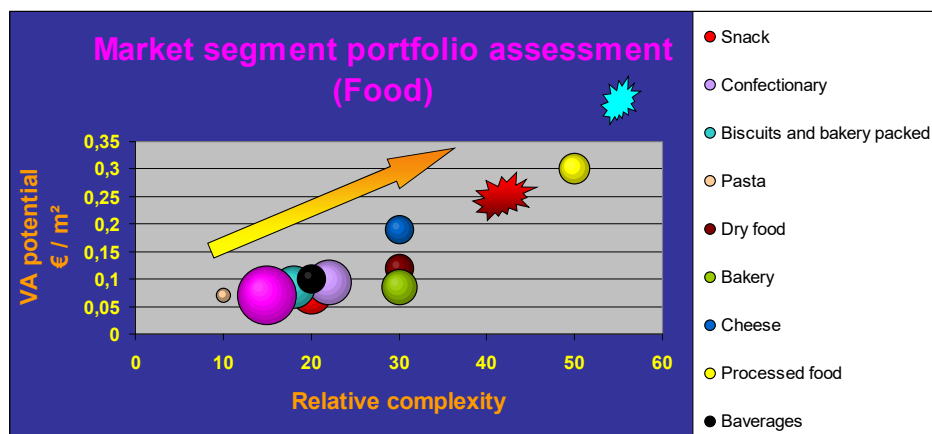
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Relative added values in food application



Source: PCI film consulting limited

Convenience food

Smart packaging

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ADDING VALUES TO OUR CUSTOMERS



Sales expertise

We have the most skilled sales team;

technical solution is always offered to get customers on board

We become consultants for our customers



Technical Service

Technical service to customers is a MUST.

Aassist customers in their factory and in our lab facilities

Fast & efficient response



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ADDING VALUES TO OUR CUSTOMERS



R&D / Quality

We develop innovative products

We follow market trends to fulfill customer needs

We offering added value to customers



Food Safety

Need to follow all different food legislations

across the world.

Food should have only Food in it



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COMPANY INTRODUCTION



MORCHEM ADDING VALUE TO OUR CUSTOMERS



HIGH SPEED LAMINATION WITH
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DIFFICULTY ON LAMINATING
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MORCHEM PROPOSAL



QUESTIONS

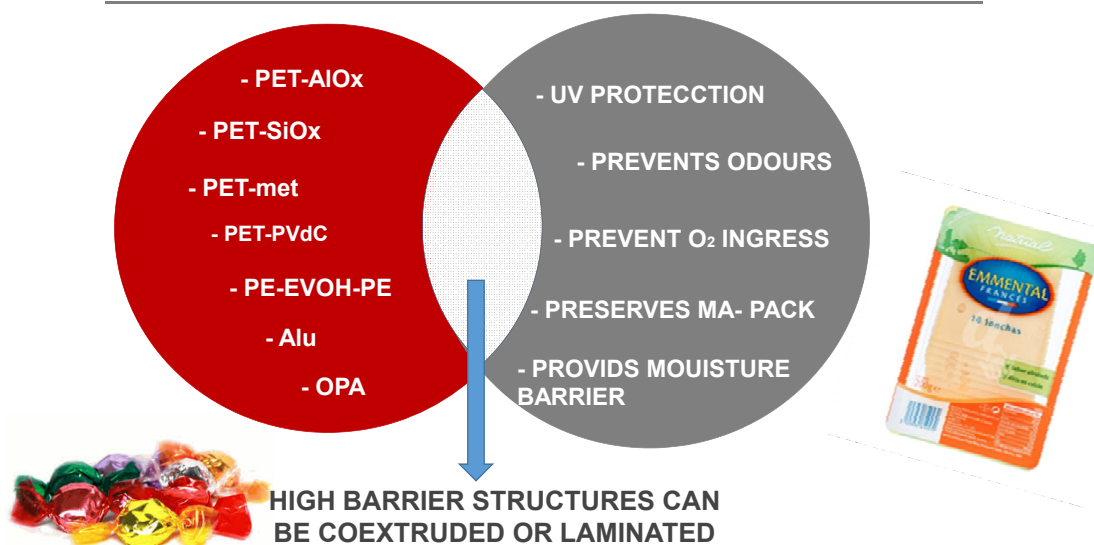
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Typical trolley SB-/SF- laminator



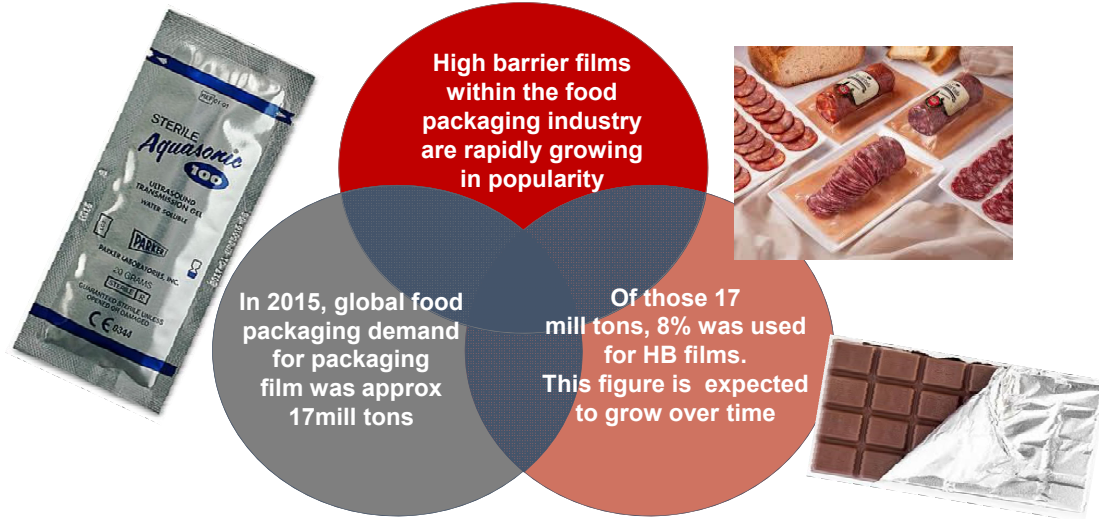
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HIGH BARRIER FILMS



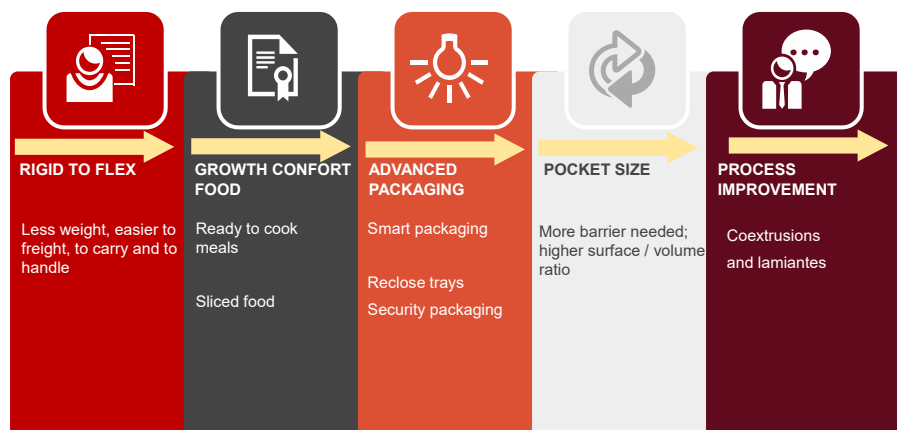
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HIGH BARRIER FILMS



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INFLUENCES ON THE HIGH BARRIER MARKET



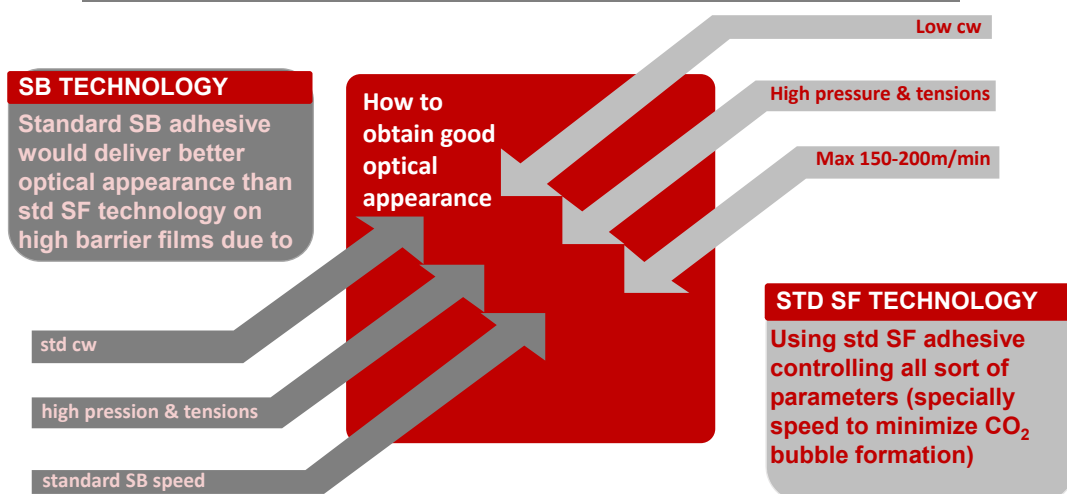
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WHY SO DIFFICULT TO LAMINATE DOUBLE BARRIER STRUCTURES?



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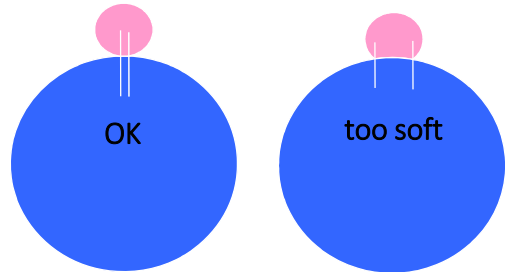
WHY SO DIFFICULT TO LAMINATE DOUBLE BARRIER STRUCTURES?



OK



Too soft

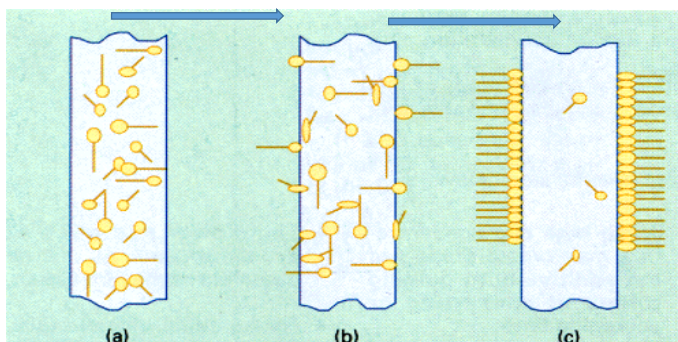


Nip station
Pressure = Force per area

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WHY SO DIFFICULT TO LAMINATE DOUBLE BARRIER STRUCTURES?

Erucamide / Oleic acid amide – Migration mechanism in PE film



Additive in
molten polymer

Migration to the surface at normal
temperature until balanced slip
concentration inside & outside

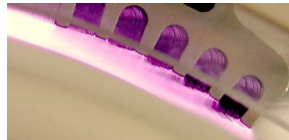
„Head“ = Polar amid group



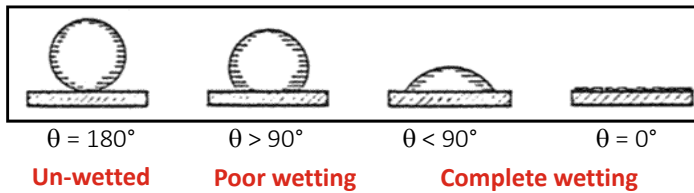
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WHY SO DIFFICULT TO LAMINATE DOUBLE BARRIER STRUCTURES?

Corona-treatment



Different drop formation on surface

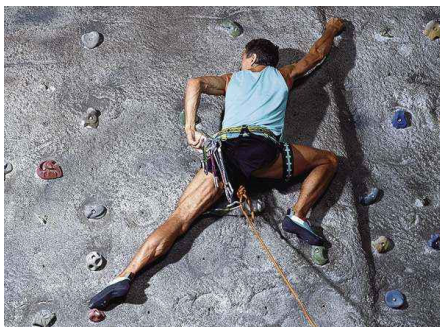


PE:	38 dyn/cm
CPP:	38 dyn/cm
OPP:	40 dyn/cm
Met. Filme:	40 dyn/cm
CPA:	50 dyn/cm
PET:	52 dyn/cm
OPA:	52 dyn/cm

H ₂ O	72,8 dyn/cm
PTFE (Teflon)	18,5 dyn/cm

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Corona-treatment

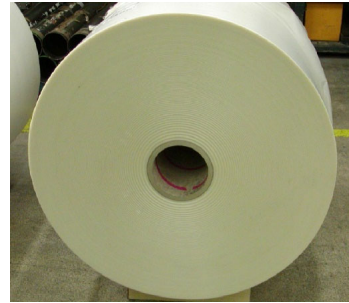
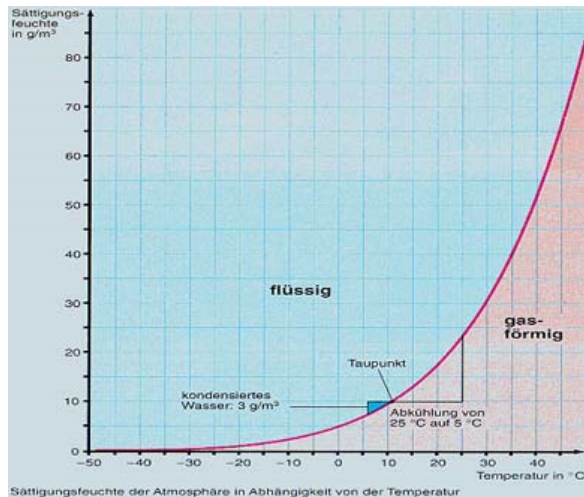


Good anchorage for best adhesion !!

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WHY SO DIFFICULT TO LAMINATE DOUBLE BARRIER STRUCTURES?

Condensation on cold films has to be avoided



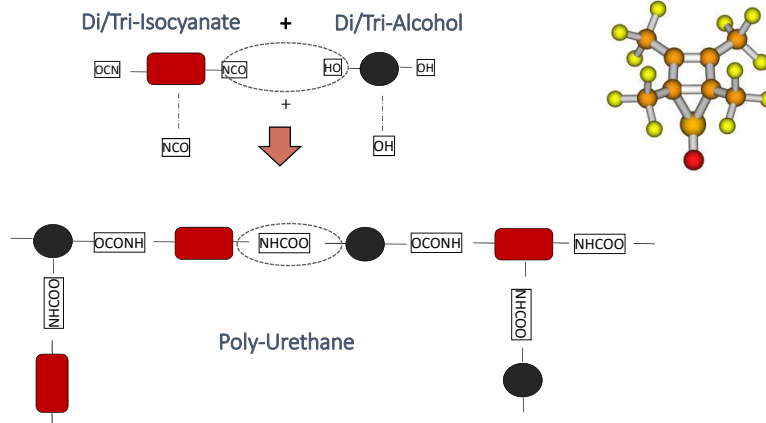
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WHY SO DIFFICULT TO LAMINATE DOUBLE BARRIER STRUCTURES?

dv (g/m ²)	R.H.%																																	
	100%	99%	98%	78%	76%	74%	72%	70%	68%	66%	64%	62%	60%	58%	56%	54%	52%	50%	48%	46%	44%	42%	40%	38%	36%	34%	32%	30%	28%	26%	24%	22%	20%	18%
0	4.85	3.88	3.78	3.68	3.59	3.49	3.39	3.29	3.20	3.10	3.00	2.91	2.81	2.71	2.62	2.52	2.42	2.33	2.23	2.13	2.03	1.94	1.84	1.74	1.65	1.55	1.45	1.36	1.26	1.16	1.07	0.97	0.87	0.78
1	5.19	4.15	4.05	3.94	3.84	3.74	3.63	3.53	3.43	3.32	3.22	3.11	3.01	2.91	2.80	2.70	2.59	2.49	2.39	2.28	2.18	2.08	1.97	1.87	1.76	1.66	1.56	1.45	1.35	1.25	1.14	1.04	0.93	0.83
2	5.56	4.44	4.33	4.22	4.11	4.00	3.89	3.78	3.67	3.56	3.44	3.33	3.22	3.11	3.00	2.89	2.78	2.67	2.56	2.44	2.33	2.22	2.11	2.00	1.89	1.78	1.67	1.56	1.44	1.33	1.22	1.11	1.00	0.89
3	5.94	4.75	4.64	4.52	4.40	4.29	4.18	4.07	3.96	3.85	3.74	3.63	3.52	3.41	3.30	3.19	3.08	2.97	2.86	2.75	2.64	2.53	2.42	2.31	2.20	2.09	1.98	1.87	1.76	1.65	1.54	1.43	1.32	1.21
4	6.36	5.08	4.96	4.83	4.70	4.58	4.45	4.32	4.19	4.07	3.94	3.81	3.69	3.56	3.43	3.30	3.18	3.05	2.92	2.80	2.67	2.54	2.41	2.29	2.16	2.03	1.91	1.78	1.65	1.53	1.40	1.27	1.14	1.02
5	6.79	5.43	5.30	5.16	5.03	4.89	4.75	4.62	4.48	4.35	4.21	4.07	3.94	3.80	3.67	3.53	3.40	3.26	3.12	2.99	2.85	2.72	2.58	2.44	2.31	2.17	2.04	1.90	1.77	1.63	1.49	1.36	1.22	
6	7.25	5.80	5.66	5.51	5.37	5.22	5.08	4.93	4.79	4.64	4.50	4.35	4.21	4.06	3.92	3.77	3.63	3.48	3.34	3.19	3.05	2.90	2.76	2.61	2.47	2.32	2.18	2.03	1.89	1.74	1.60	1.45	1.31	1.16
7	7.74	6.19	6.04	5.89	5.73	5.58	5.42	5.27	5.11	4.96	4.80	4.65	4.49	4.34	4.18	4.03	3.87	3.72	3.56	3.41	3.25	3.10	2.94	2.79	2.63	2.48	2.32	2.17	2.01	1.86	1.70	1.55	1.39	1.24
8	8.26	6.61	6.44	6.28	6.11	5.95	5.78	5.62	5.45	5.29	5.12	4.96	4.79	4.63	4.46	4.30	4.13	3.97	3.80	3.64	3.47	3.30	3.14	2.97	2.81	2.64	2.48	2.31	2.15	1.98	1.82	1.65	1.49	1.32
9	8.81	7.05	6.87	6.70	6.52	6.34	6.17	5.99	5.81	5.64	5.46	5.29	5.11	4.93	4.76	4.58	4.41	4.23	4.05	3.88	3.70	3.52	3.35	3.17	3.00	2.82	2.64	2.47	2.29	2.11	1.94	1.76	1.59	1.41
10	9.39	7.51	7.32	7.14	6.95	6.76	6.57	6.39	6.20	6.01	5.82	5.63	5.45	5.26	5.07	4.88	4.69	4.51	4.32	4.13	3.94	3.76	3.57	3.38	3.19	3.00	2.82	2.63	2.44	2.25	2.07	1.88	1.69	1.50
11	10.00	8.00	7.80	7.60	7.40	7.20	7.00	6.80	6.60	6.40	6.20	6.00	5.80	5.60	5.40	5.20	5.00	4.80	4.60	4.40	4.20	4.00	3.80	3.60	3.40	3.20	3.00	2.80	2.60	2.40	2.20	2.00	1.80	1.60
12	10.65	8.52	8.31	8.09	7.88	7.67	7.46	7.24	7.03	6.82	6.60	6.39	6.18	5.96	5.75	5.54	5.33	5.11	4.90	4.69	4.47	4.26	4.05	3.83	3.62	3.41	3.20	2.98	2.77	2.56	2.34	2.13	1.92	1.70
13	11.33	9.07	8.84	8.61	8.39	8.16	7.93	7.71	7.48	7.25	7.03	6.80	6.57	6.35	6.12	5.89	5.67	5.44	5.21	4.99	4.76	4.53	4.31	4.08	3.85	3.63	3.40	3.17	2.95	2.72	2.49	2.27	2.04	1.81
14	12.05	9.64	9.40	9.16	8.92	8.68	8.44	8.20	7.96	7.71	7.47	7.23	6.99	6.75	6.51	6.27	6.03	5.79	5.54	5.30	5.06	4.82	4.58	4.34	4.10	3.86	3.62	3.38	3.13	2.89	2.65	2.41	2.17	1.93
15	12.82	10.25	10.00	9.74	9.48	9.23	8.97	8.71	8.45	8.20	7.95	7.69	7.43	7.18	6.92	6.66	6.41	6.15	5.89	5.64	5.38	5.13	4.87	4.61	4.36	4.10	3.84	3.58	3.33	3.08	2.82	2.56	2.31	2.05
16	13.62	10.89	10.62	10.35	10.08	9.80	9.53	9.26	8.99	8.71	8.44	8.17	7.90	7.62	7.35	7.08	6.81	6.54	6.26	5.99	5.72	5.45	5.17	4.90	4.63	4.36	4.08	3.81	3.54	3.27	3.00	2.72	2.45	2.18
17	14.46	11.57	11.28	10.99	10.70	10.41	10.12	9.83	9.54	9.26	8.97	8.68	8.39	8.10	7.81	7.52	7.23	6.94	6.65	6.36	6.07	5.78	5.50	5.21	4.92	4.63	4.34	4.05	3.76	3.47	3.18	2.89	2.60	2.31
18	15.35	12.27	11.97	11.67	11.36	11.05	10.75	10.44	10.13	9.82	9.51	9.20	8.89	8.58	8.27	7.96	7.65	7.34	7.03	6.72	6.41	6.10	5.79	5.48	5.17	4.86	4.55	4.24	3.93	3.62	3.31	3.00	2.69	2.38
19	16.29	13.03	12.70	12.34	12.01	11.67	11.33	10.99	10.64	10.29	9.94	9.59	9.24	8.89	8.54	8.19	7.84	7.49	7.14	6.79	6.44	6.09	5.74	5.39	5.04	4.69	4.34	3.99	3.64	3.29	2.94	2.59	2.24	1.89
20	17.27	13.82	13.47	13.13	12.78	12.44	12.11	11.77	11.44	11.11	10.77	10.43	10.09	9.75	9.41	9.07	8.73	8.39	8.05	7.70	7.36	7.02	6.68	6.34	5.99	5.65	5.31	4.97	4.63	4.29	3.95	3.61	3.27	2.93
21	18.31	14.65	14.28	13.92	13.55	13.19	12.83	12.47	12.11	11.75	11.39	11.03	10.67	10.31	9.95	9.59	9.23	8.87	8.51	8.15	7.79	7.43	7.07	6.71	6.35	5.99	5.63	5.27	4.91	4.55	4.19	3.83	3.47	3.11
22	19.40	15.52	15.13	14.75	14.36	13.97	13.58	13.19	12.80	12.41	12.02	11.63	11.24	10.85	10.46	10.07	9.68	9.29	8.90	8.51	8.12	7.73	7.34	6.95	6.56	6.17	5.78	5.39	4.99	4.60	4.21	3.82	3.43	3.04
23	20.55	16.44	16.03	15.62	15.20	14.79	14.38	13.97	13.55	13.14	12.73	12.32	11.91	11.50	11.09	10.68	10.27	9.86	9.45	9.04	8.63	8.22	7.81	7.40	6.99	6.58	6.17	5.76	5.35	4.94	4.53	4.12	3.71	3.30
24	21.75	17.40	16.97	16.53	16.10	15.66	15.23	14.79	14.36	13.93	13.50	13.07	12.64	12.22	11.79	11.36	10.93	10.50	10.07	9.64	9.21	8.78	8.35	7.92	7.49	7.06	6.63	6.20	5.77	5.34	4.91	4.48	4.05	3.62
25	23.02	18.41	17.97	17.53	17.09	16.65	16.21	15.77	15.33	14.89	14.45	14.01	13.57	13.13	12.69	12.25	11.81	11.37	10.93	10.49	10.05	9.61	9.17	8.73	8.29	7.85	7.41	6.97	6.53	6.09	5.65	5.22	4.79	4.35
26	24.34	19.47	18.99	18.50	18.01	17.52	17.04	16.55	16.07	15.58	15.09	14.60	14.12	13.63	13.14	12.65	12.16	11.67	11.18	10.69	10.20	9.71	9.22	8.73	8.24	7.75	7.26	6.77	6.28	5.79	5.30	4.81	4.32	3.83
27	25.73	20.59	20.07	19.56	19.04	18.53	18.01	17.50	16.98	16.47	15.95	15.44	14.92	14.41	13.89	13.38	12.86	12.35	11.83	11.32	10.80	10.29	9.78	9.27	8.76	8.25	7.74	7.23	6.72	6.21	5.70	5.19	4.68	4.17
28	27.19	21.75	21.21	20.67	20.12	19.58	19.04	18.49	17.95	17.40	16.86	16.32	15.77	15.23	14.68	14.14	13.60	13.05	12.51	11.97	11.43	10.89	10.35	9.81	9.27	8.73	8.19	7.65	7.11	6.57	6.03	5.49	4.95	4.41
29	28.72	22.98	22.40	21.83	21.26	20.69	20.11	19.53	18.96	18.38	17.81	17.23	16.66	16.08	15.51	14.94	14.36	13.79	13.21	12.64	12.07	11.50	10.93	10.36	9.79	9.22	8.65	8.08	7.51	6.94	6.37	5.80	5.23	4.66
30	30.33	24.26	23.65	23.05	22.44	21.83	21.23	20.62	20.02	19.41	18.80	18.20	17.59	16.98	16.38	15.77	15.16	14.55	13.94	13.33	12.72	12.11	11.50	10.89	10.28	9.67	9.06	8.45	7.84	7.23	6.62	6.01	5.40	4.79
31	32.01	25.80	25.18	24.56	23.94	23.32	22.70	22.08	21.46	20.84	20.22	19.60	18.98	18.36	17.74	17.12	16.50	15.88	15.26	14.64	14.02	13.40	12.78	12.16	11.54	10.92	10.30	9.68	9.06	8.44	7.82	7.20	6.58	5.96
32	33.76	27.01	26.38	25.75	25.12	24.49	23.86	23.23	22.60	21.97	21.34	20.71	20.08	19.45	18.82	18.19	17.56	16.93	16.30	15.67	15.04	14.41	13.78	13.15	12.52	11.89	11.26	10.63	10.00	9.37	8.74	8.11	7.48	6.85
33	35.60	28.48	27.77	27.06	26.35	25.64	24.92	24.21	23.50	22.79	22.07	21.36	20.65	19.94	19.23	18.51	17.80	17.09	16.38	15.67	14.96	14.25	13.54	12.83	12.12	11.41	10.70	10.00	9.30	8.60	7.90	7.20	6.50	5.80
34	37.53	30.02	29.27	28.52	27.77	27.02	26.27	25.52	24.77	24.02	23.27	22.52	21.77	21.02	20.27	19.51	18.76	18.01	17.26	16.51	15.76	15.01	14.26	13.51	12.76	12.01	11.26	10.51	9.76	9.01	8.26	7.51	6.76	6.01
35	39.54	31.63	30.80	30.05	29.29	28.47	27.68	26.88	26.10	25.31	24.52	23.72	22.93	22.14	21.35	20.56	19.77	18.98	18.19	17.40	16.61	15.82	15.03	14.23	13.44	12.64	11.85	11.07	10.28	9.49	8.71	7.92	7.13	6.33
36	41.65	33.32	32.48	31.65	30.82	29.99	29.15	28.31	27.49	26.65	25.82	25.00	24.15	23.32	22.49	21.66	20.83	20.00	19.16	18.33	17.49	16.65	15.83	15.00	14.16	13.33	12.49	11.66	10.83	10.00				

WHY SO DIFFICULT TO LAMINATE DOUBLE BARRIER STRUCTURES?

HOW DO THE 2K SYSTEM ADHESIVE REACT WHEN WE MIX THEM?

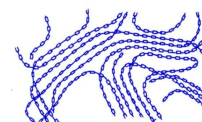
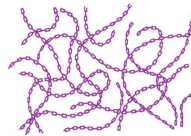
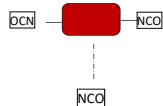


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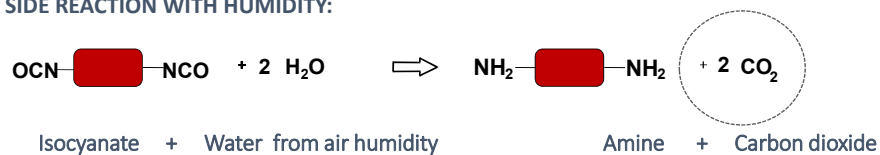
WHY SO DIFFICULT TO LAMINATE DOUBLE BARRIER STRUCTURES?

CROSSLINKING FORMATION

Di/Tri-Isocyanate



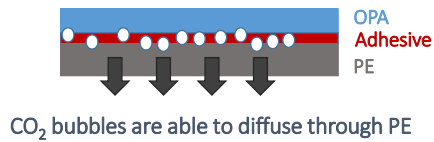
SIDE REACTION WITH HUMIDITY:



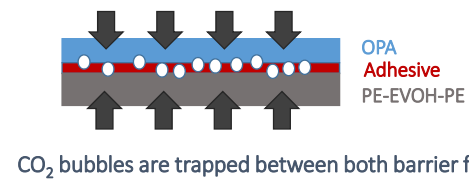
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STANDARD LAMINATE

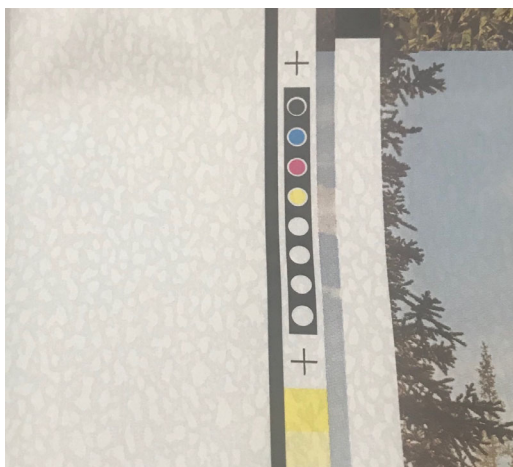


HIGH BARRIER LAMINATE



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WHY SO DIFFICULT TO LAMINATE DOUBLE BARRIER STRUCTURES?



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AGENDA:

■	COMPANY INTRODUCTION
■	MORCHEM ADDING VALUE TO OUR CUSTOMERS
■	HIGH SPEED LAMINATION WITH DOUBLE BARRIER STRUCTURES - INTRO
■	DIFFICULTY ON LAMINATING DOUBLE BARRIER STRUCTURES WITH SF ADHESIVE
■	MORCHEM PROPOSAL
■	QUESTIONS

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Our proposal in high barrier films

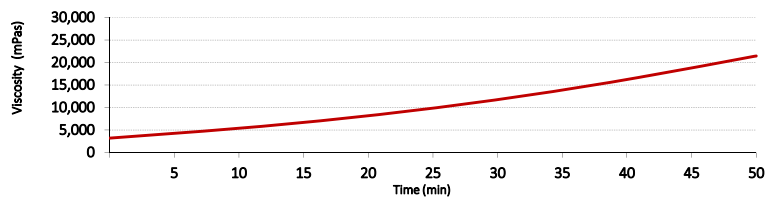
FEATURES	OVERVIEW
PL 278 A + CF 744 - Very Fast PAA - Excellent Optical appearance - COF No COF modification - Fast speed lamination with high Barrier - Very good Chemical Resistance - Very good Thermal Resistance	- Semi aliphatic system. - Excellent wettability at high web speed - Fast speed lamination >350 m/min - Excellent leveling on printed films. - Very good chemical & thermal resistance
	APPLICATIONS Fresh daily meal, trays and lidding laminates, coffee...

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Our proposal in high barrier films

PRODUCT	MORCHEM PL 278 A	MORCHEM CF-744	BENEFITS
Solids	100 %	100 %	- Excellent ratio Pot-life- Curing time on reel - Easy to clean - Excellent wettability
Viscosity (25 °C)	9.000 mPa.s	2.000 mPa.s	
Density (20 °C)	1,14 g/cm³	1,11 g/cm³	
Functionality	-NCO	-OH	
Mix Ratio	100	46	

Reactivity curve @ 40°C

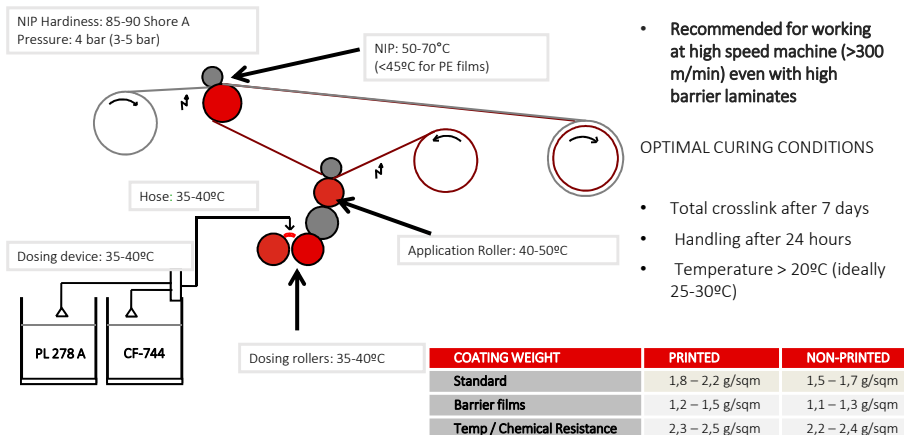


Excellent pot life and Easy to clean system

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Application settings



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PAA decay		BENEFITS
ALU / PE 30μ-300ppm	Time to comply the regulation	- Extremely fast PAA decay - Below EU limit under 24 hours - Faster delivery, less storage time
Regulation EU 10/2011 : PAA < 10 ppb	24h	
BfR XLI : PAA < 2 ppb	24h	

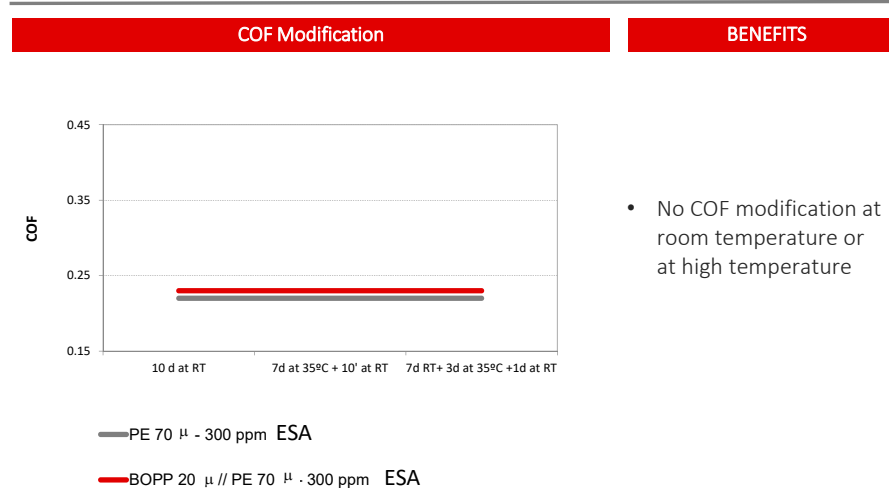
EU 10/2011 PAA migration limit < 10 ppb

BfR Recommendation XLI < 0,20 mg/100 ml

Extremely fast PAA decay to comply quicker with food legislation requirements

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Our proposal in high barrier films



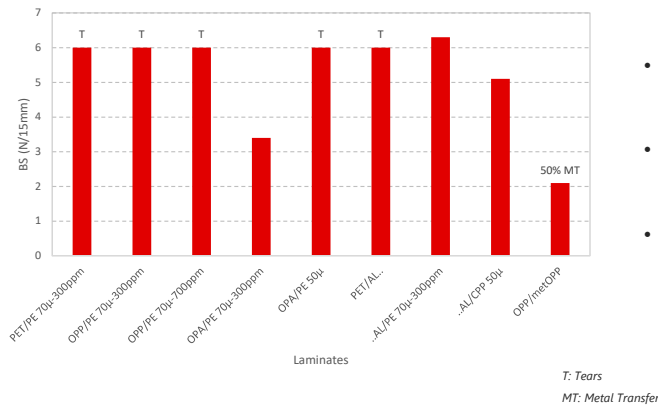
Temperature does not modify COF

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Our proposal in high barrier films

Bond strength 7 days – 22°C

BENEFITS



- Very good bond strength in all kind of materials
- Excellent adhesion on high additivated Polyolefin films
- Excellent adhesion on ALU – cPP and ALU-PE

Excellent adhesion to films, metalized and foil

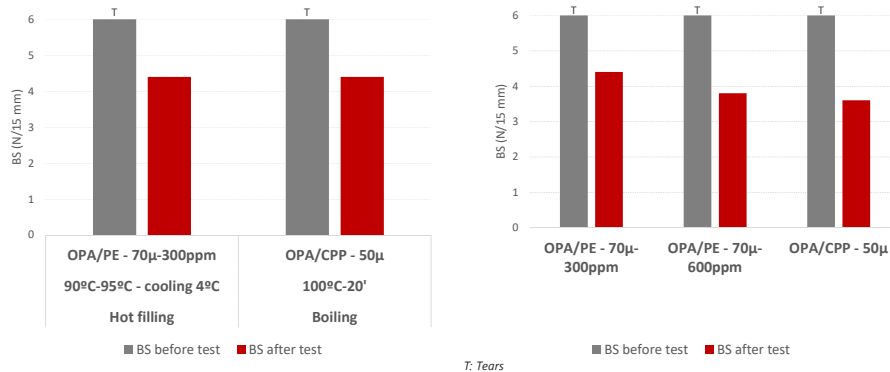
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Our proposal in high barrier films

Thermal Resistance

Hot filling & Boiling

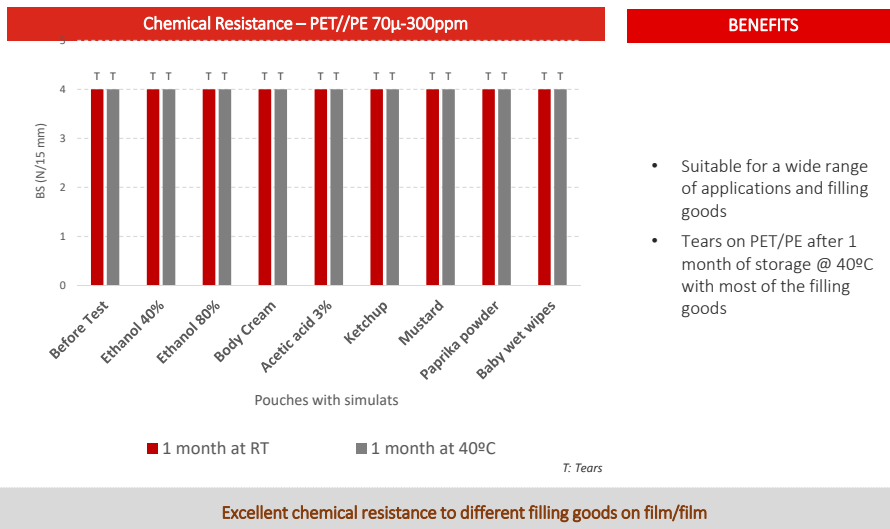
Pasteurization: 90°C – 1 hour



Excellent thermal resistance in film/film laminates.

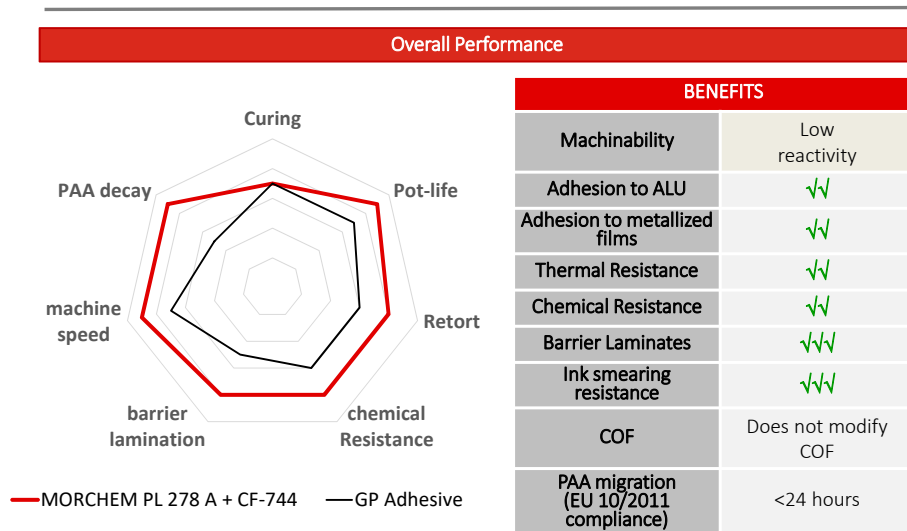
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Our proposal in high barrier films



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- QUESTIONS

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ANY
QUESTIONS?

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**“Thank You”
for sticking with my
presentation**

Presented by:

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