Flexocure XS

Maximum Shrink –

Expand your business!

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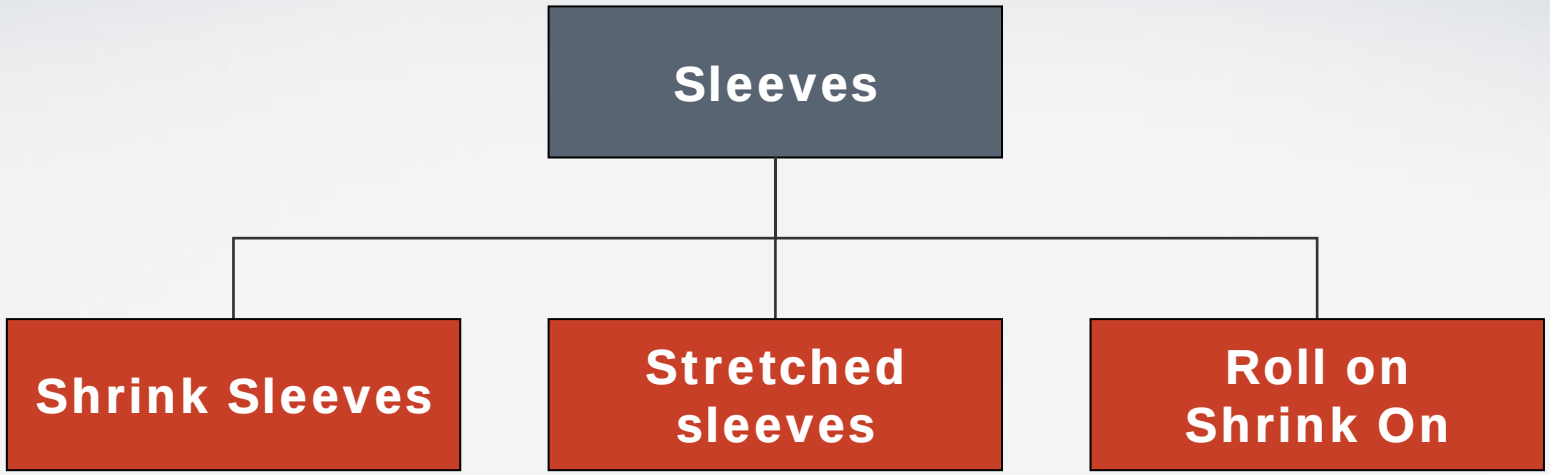
Narrow web market segments



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UV inks for sleeves

- Technical challenge to maintain ability to shrink, as ink is cross-linked when drying/curing
- Need to combine "conflicting" parameters
  - High speed curing/ ink film that shrinks
  - Scratch resistance /adhesion to film
- Adhesion to wide range of substrates (PET, OPP, OPS, PVC, PLA) without the need of primers
- Handle different surface slip characteristics – "COF"
- High colour strength – make product stand out
- Cope with varying degree of shrinkage

Flexocure XS

Maximum shrink for any type of sleeve!

- Special free radical UV Flexo ink for Shrink sleeves with maximum ability to shrink
- Suitable for a wide range of films, including
  - PVC, OPS, PLA, OPP, PET & PETG.
- Flexocure XS eliminating the need for primers or over-print varnishes.
- Excellent scratch resistance also when shrunk more than 70%.
- Flexocure XS can be used for both front side & reverse printing.
- Very high colour strength, high cure speed and excellent press & print performance.
- Opaque White ink with very low COF.

Flexocure XS is better in print quality

Nutrition information
Typical Values per 100g
Energy ..... 485 k
Protein.....
Carbohydrate.....
of which sugars.....
Fat .....
of which saturates.....
Fibre.....
Sodium.....

GLUTEN

Ingredients:
Fruit (55%) (Strawberry, Re
Morello Cherry, Raspberry),
Water, Gelling Agent: Pecti
Acid, Preservative: Potassiu
Acidity Regulator: Tricalciur

Store in a cool, dry place.
Once opened, refrigerate and use wit

- ✓ Reduced in Sugars
- ✓ Only 0.1% Fat
- ✓ Gluten free
- ✓ No Added Flavourings
- ✓ No Added Colourings

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Solvent Flexo

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Shrink Sleeves– 360 degree decoration

- Benefits with Shrink sleeve
- 360 degree decoration
- Any shape decorated
- Degree of shrinkage measured in % of largest vs smallest diameter

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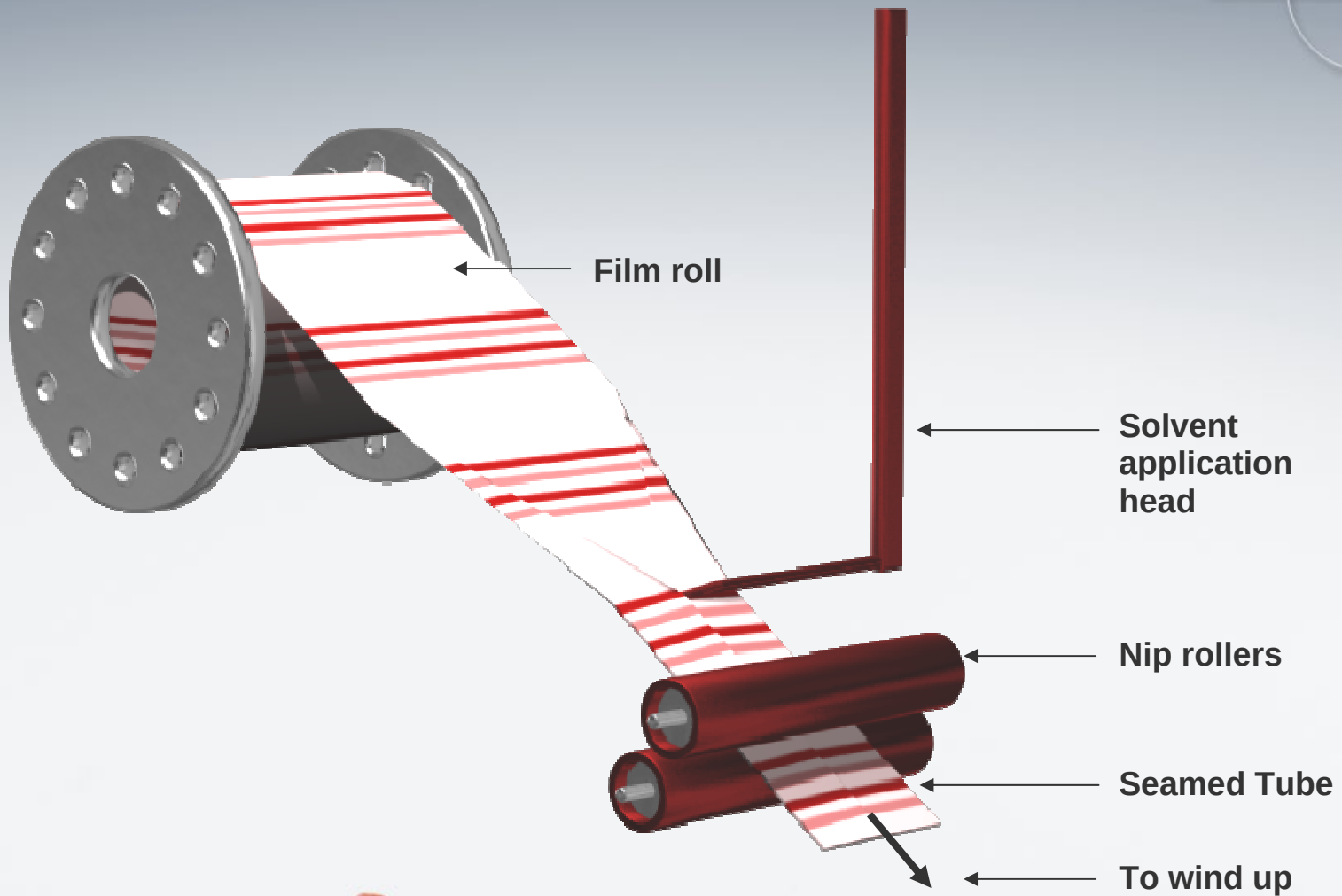
Sleeve welding



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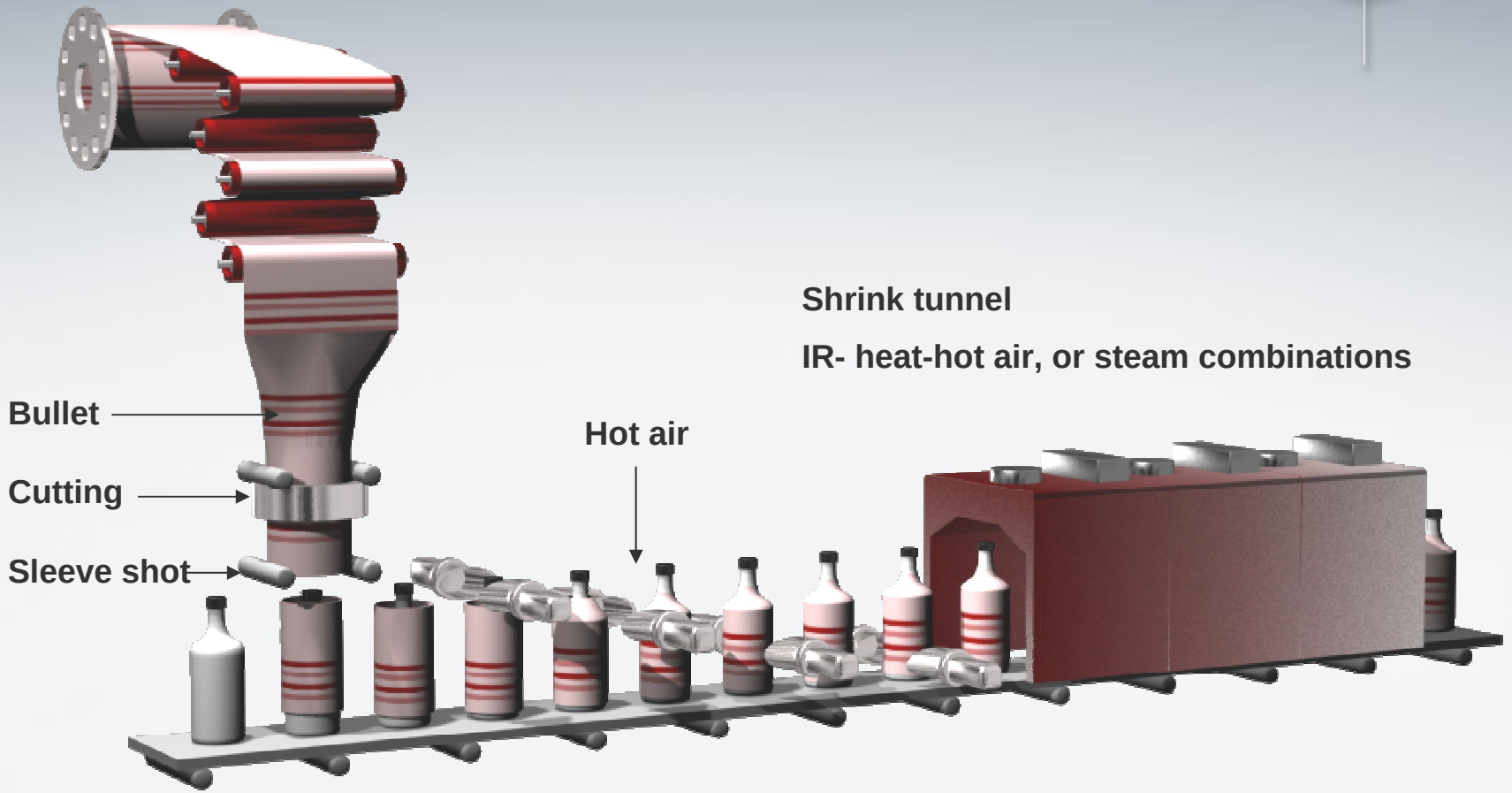
Shrink sleeve

application and Shrinking system



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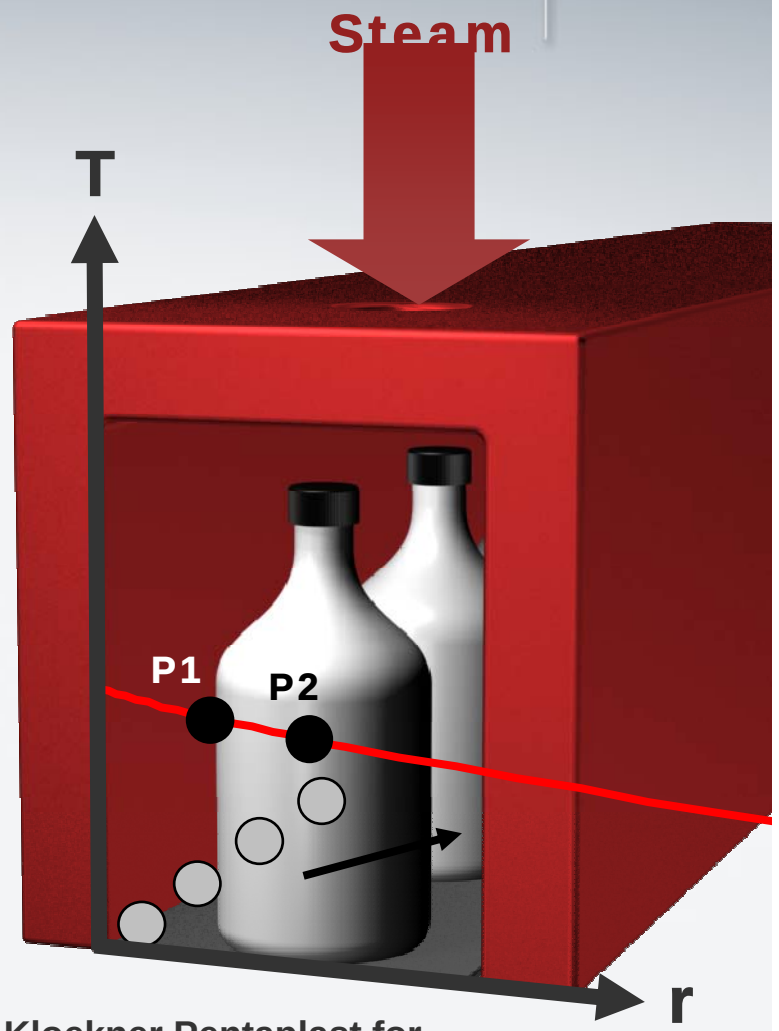
Steam Tunnel

Typical characteristics of different shrink equipment's

- low temperatures
  - <100 °C, low initiation temp.
  - shrink film useful
- high heat capacity
- extremely low temp. gradient
  - $T_{P1} \cong T_{P2}$ → best shrink result
- high investment costs
  - except: steam is available
- high energy costs
  - except: steam is available



Credits to Kloekner Pentaplast for image and info

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Test to get full insight

- Tested UV flexo inks on 4 substrate- all 50 microns
  - PVC from Ineos Films
  - PLA EarthFirst® from Sidaplax
  - OPS & PET-G from Bonset America
- Test adhesion, scratch, printability, odour, gloss (all accepted)
- Sleeve test at Krones – 22 500 bottles / h (max)
- Continue to substrates long term for dimension stability

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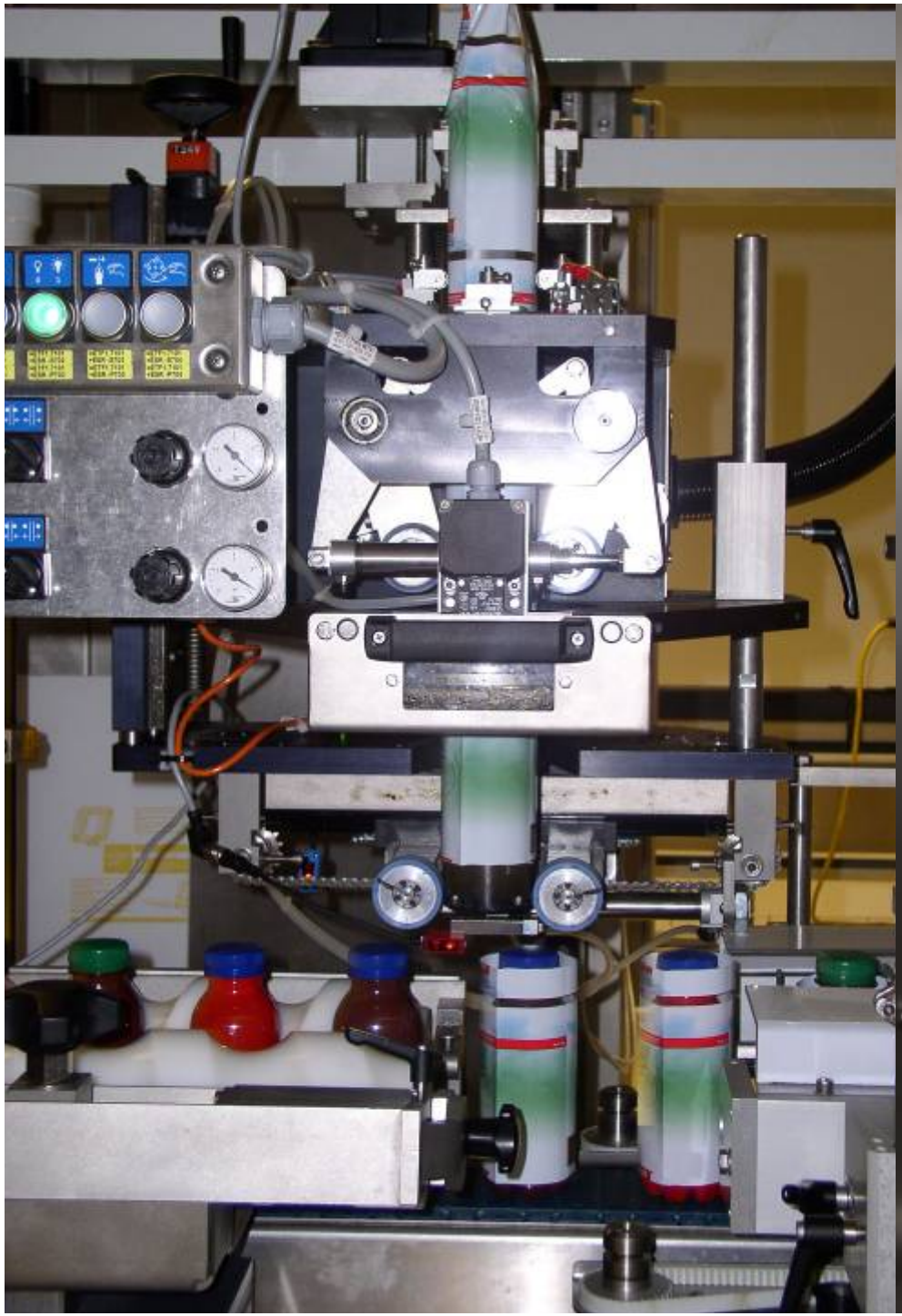

Material is OPS – difference between OK to left & poor to right is temperature in shrink tunnel

Flexocure XS – no distortion of image when shrinking

Sleeve printed with Flexocure XS

– clear & colourful image!

Sleeve printed with different ink
– weak, damaged, blurry image

Inks for Sleeves

	WB Flexo	UV LP	**UV Flexo**	UV Offset
Low Shrink < 25%	Hydrofilm 4000	UvoNova	Flexocure Σ Flexocure Gemini **Flexocure XS**	Lithocure 3 G
Medium shrink 25% to 50%	Hydrofilm 4000	UvoNova	Flexocure Gemini **Flexocure XS**	**-**
High Shrink > 50%	Hydrofilm 4000	-	**Flexocure XS**	**-**

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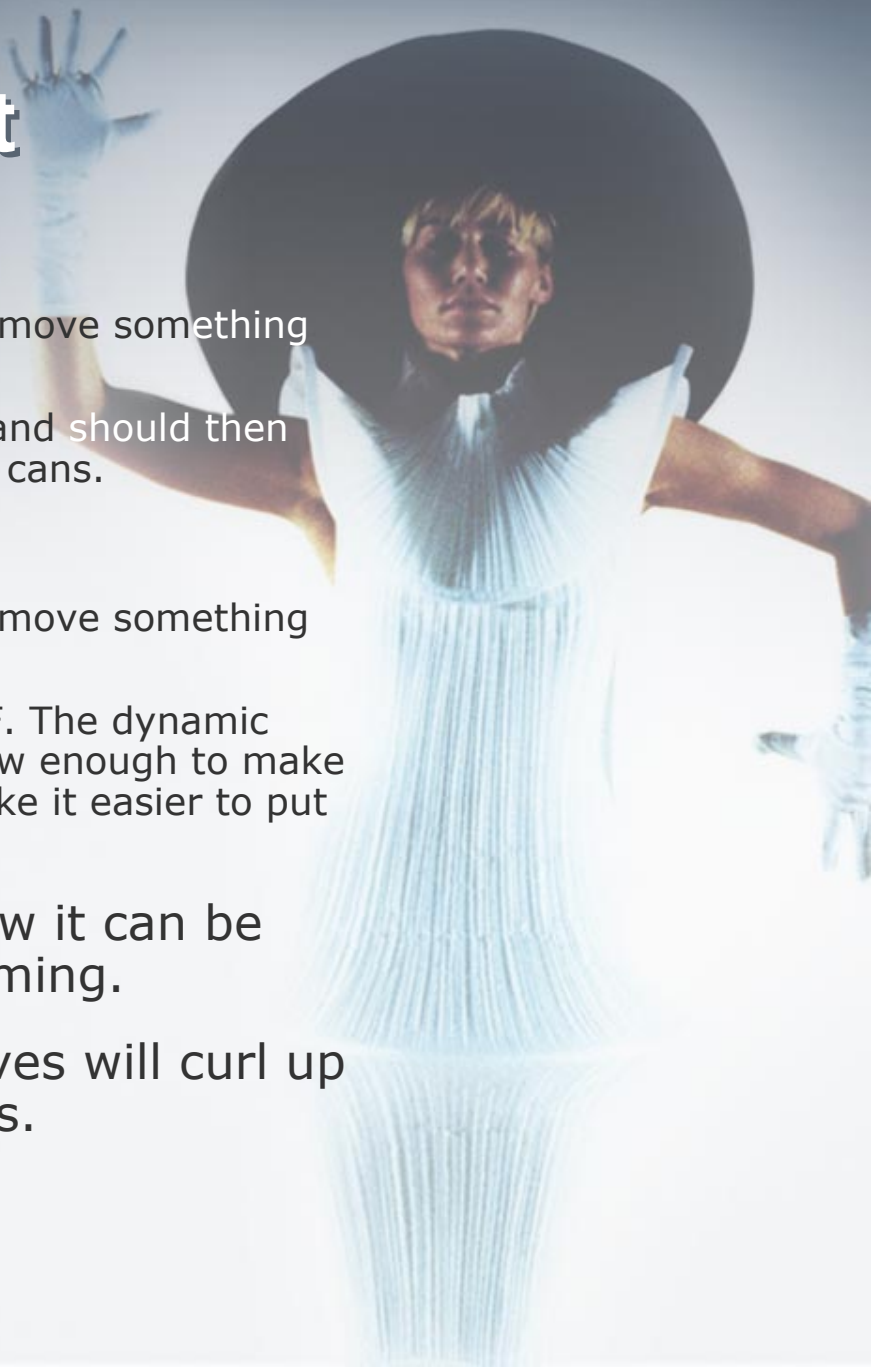
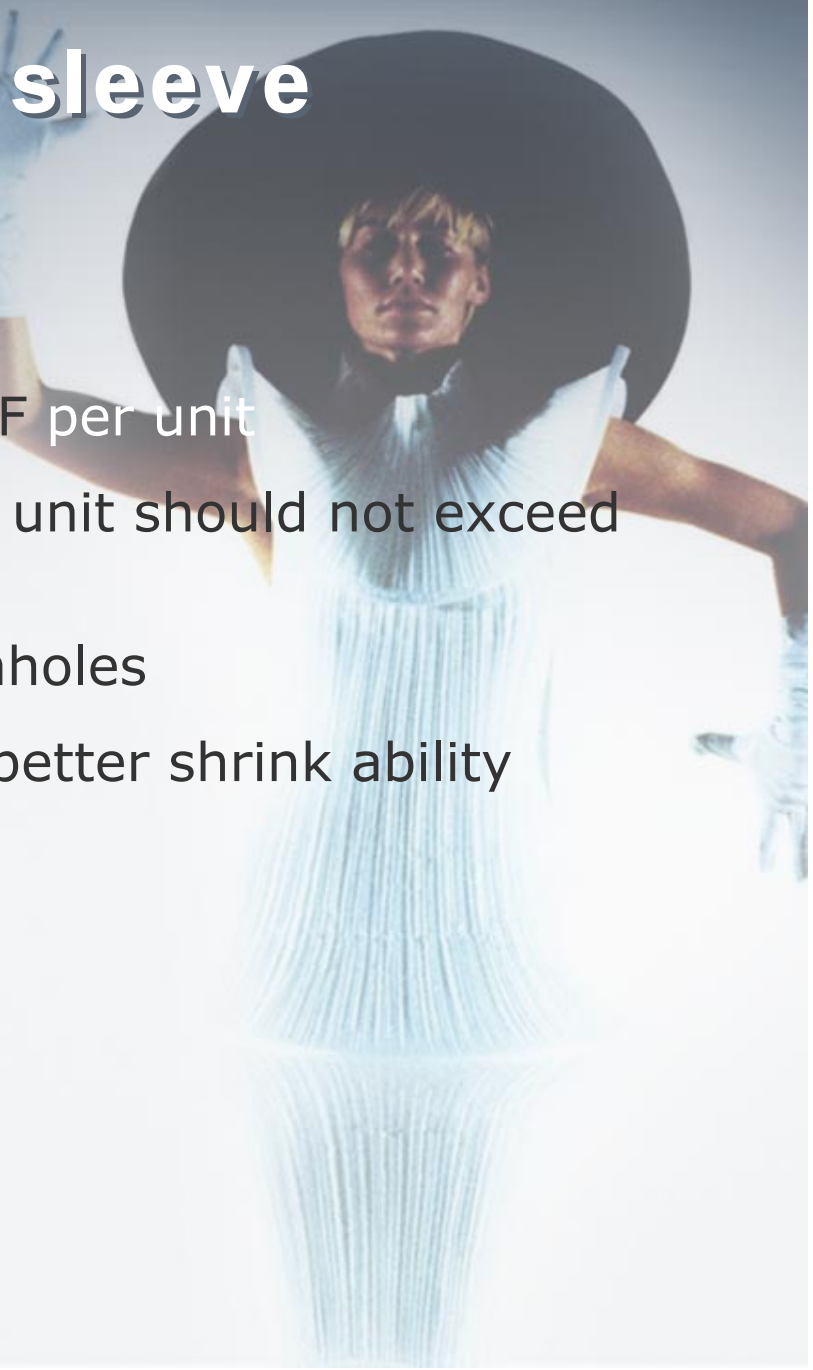
The slip is important

- Static COF
  - is calculated from the force that is needed to move something that is lying still on the surface.
  - This is important for roll-on-shrink-on labels and should then not be too low so that the labels "slip off" the cans.
- Dynamic COF
  - is calculated from the force that is needed to move something over the surface once it has started to move.
  - This value is always lower than the static COF. The dynamic COF is important for sleeves and should be low enough to make processing in seam machines easy and to make it easier to put the sleeves on the bottles.
- If the static and dynamic COF is too low it can be difficult to handle the reels before seaming.
- If the dynamic COF is to high the sleeves will curl up and do not work on high speed bottlers.



Flexocure XS - shrink sleeve success

- Surface tension > 38 dyne
- Chiller drums to be set at 20°C / 68°F per unit
- First unit should be 20°C / 68°F, last unit should not exceed 30°C / 86°F
- Use hard plate as this will reduce pinholes
- 2 hits with “normal” lay down gives better shrink ability then 1 heavy ink lay down.



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Anilox Recommendations

Parameters	Pantone®	Solids	Process
Lines/cm	160-180	120-180	300-400
Lines/inch	400-460	300-460	760-1270
Volume (cm^3/m^2)	5-6	5-10*	3-4
Angle (deg)	60	60	60
Film weight (g/m^2)	1,6-1,8	1,6-3,0	1,0-1,2
UV lamps (W/cm)	160	160	160
Print speed m/min	80 -150	80 -150	100 - 150

* Only suitable for opaque white, due to its density

	Kefir	Wave	Coca Cola	Smyth	Harpic
Smallest (cm)	13,7	12,5	8	9,5	12
Widest (cm)	27,5	24,7	18,3	23,5	23,4
Void to allow process (cm)	1,5	1,5	1,5	1,5	1,5
Shrink %	53%	52%	60%	62%	> 70%

Shrink calculation: 1- (Smallest/(widest+void))

Shrink examples/

Current issues using UV inks

- How to combine High Opacity with good shrinkage?
  - Opacity proportional to ink layer – but difficult to cure
  - Too thick layer cause bad shrink performance.
  - Recommend to try to use 2 layer of Opaque White – and as little as possible in high shrink areas – print white in dots (for ex 60-70% as when the dots shrink they for solid area).
- Metallic inks – not loosing metallic effect
  - 15-20% shrinkage using right metallic inks
- Low odour UV technology is available – but is it low enough?
- Thick layers of ink resulting in "relief" effect after shrinking

Flexocure XS facts

Parameters	Flexocure XS New OP White	Flexocure XS old Op white
Contrast value OP White 100 l/cm , vol 10 cm^3/m^2	80 - 82	72 - 76
Adhesion	PVC, PLA, OPP, PET, PET-G, OPS	PVC, PLA, OPP, OPS
COF – dynamic **COF - static**	0,31 0,46	0,45 0,76
Odour	Very low	High / medium
Maximum shrink	> 70 %	Max 50 %

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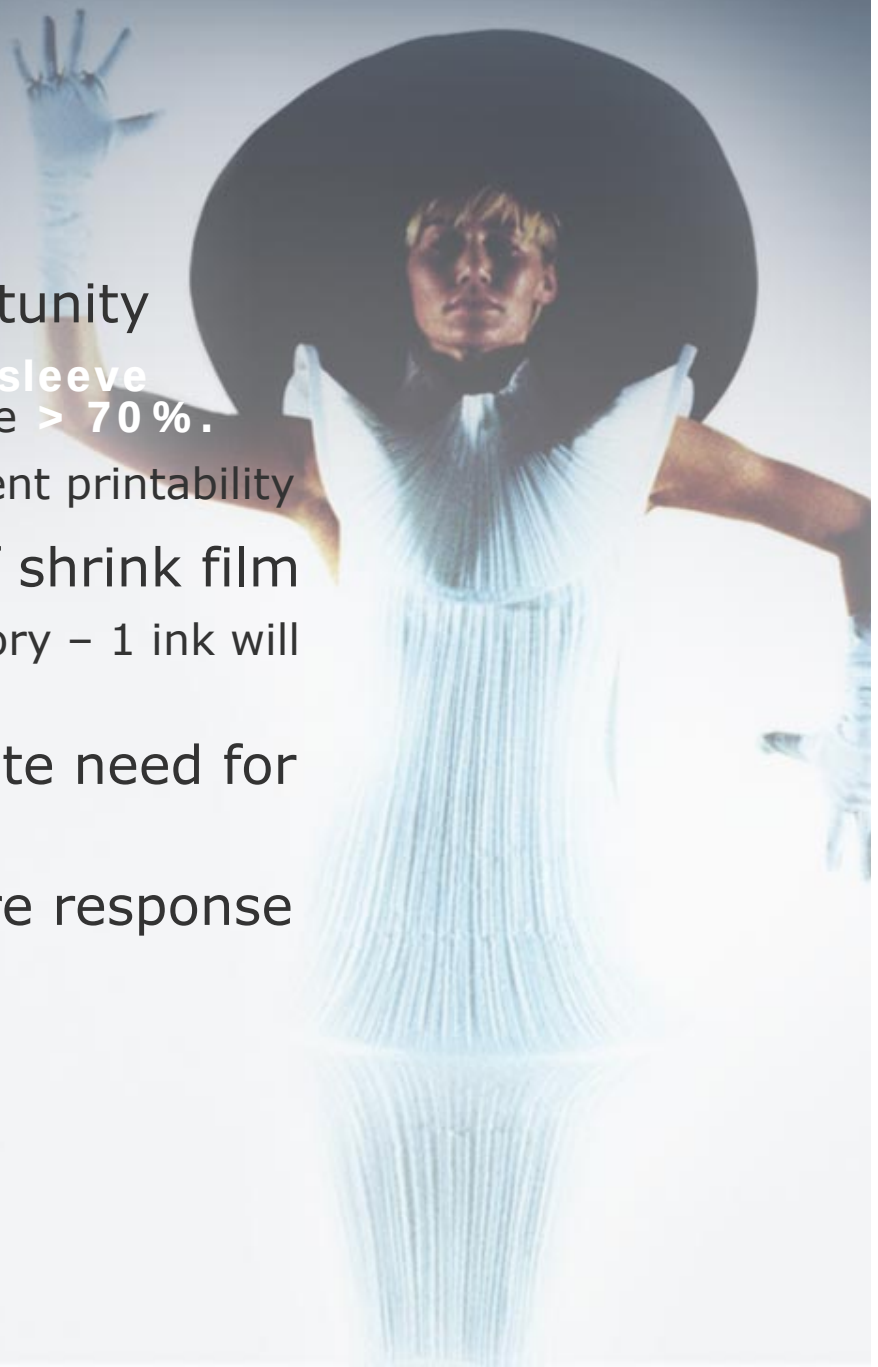

- High Shrink ability creates opportunity
  - Flexocure XS will work on any shrink sleeve application as it shrinks with substrate > 70%.
  - Vibrant colour reproduction an excellent printability
- Excellent adhesion to all types of shrink film
  - possible for printers to reduce inventory – 1 ink will work on any shrink sleeve
- Excellent scuff resistance eliminate need for overprint varnish
- Excellent colour strength and cure response improves profitability

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