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# TEASE TIPPING: TO PROTECT AND TO ATTRACT

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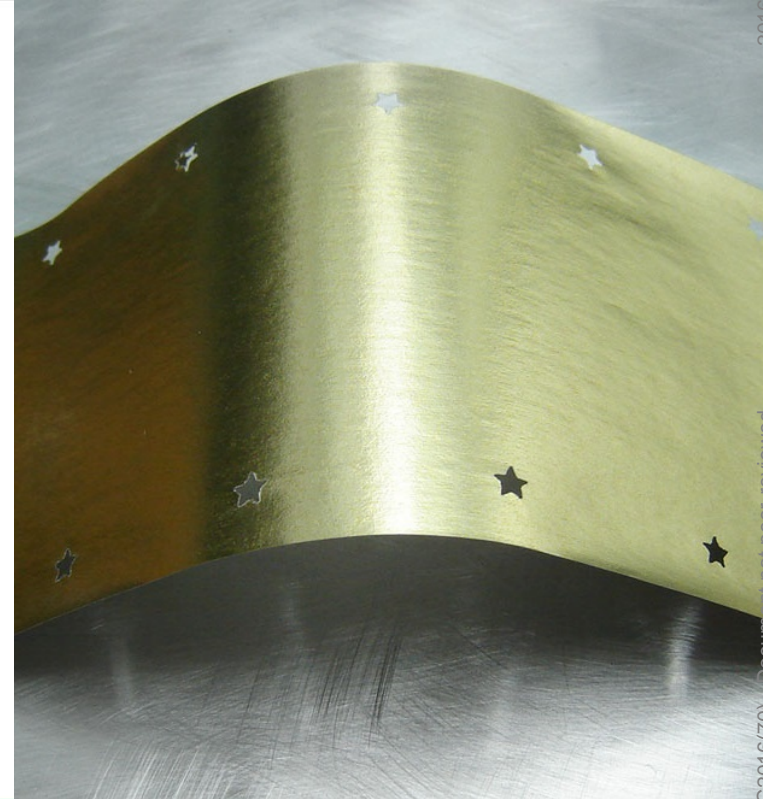
# Tipping Perforation (Filter Ventilation) Methods

- Traditional techniques
  - Electrostatic perforation (offline)
  - Laser perforation (offline & online)
- Advanced technology:
  - Plasma Perforation
  - Improved physical & sensory cigarette properties, efficient smoke yields reduction
- Smart & creative method:
  - **Tease Tipping**
  - “Window Perforation“ via open windows / macroscopic inspection holes



# Formation of Open Windows

- Two options for high-precision die-cutting:
  - Accurate mechanical punching process
  - Sophisticated & powerful laser system
- Targets:
  - Flexibility in window designs & dimensions
  - High dimensional stability of the established inspection holes
  - Window generation on the running web of Tipping Paper
  - Application on any flat & flexible material
  - Good visibility & detectability on cigarettes



# Technical Features of Tease Tipping

- Main objectives:
  - Alternative way of diluting the mainstream smoke of cigarettes (“**to protect**”)
  - Same efficiency in ventilation rates as with conventional perforation methods
- Combination with
  - standard filters + porous plug wrap paper
  - non-wrapped acetate (NWA) filters
  - adhesive-free area underneath the Tipping Paper
- Perfect runnability on cigarette machines



# Design Features of Tease Tipping (Part I)

- Main objectives:
  - Optically appealing open windows (“**to attract**”)
  - Inspection hole with a size to visualize a specific layer underneath the hole
- Single or multiple hole formation
- Combination with
  - colorful or dyed plug wrap paper
  - transparent or semi-transparent sub-layer
  - special filters (chamber, charcoal or segment filters)



# Design Features of Tease Tipping (Part II)

- Design challenge with standard filters & plug wrap paper: Visible filter discoloration during the smoking process
- Displaceable / rotatable / sealed windows (to be uncovered by the consumer):
  - Revealment of a winning code, brand information, etc.
  - Release of aromas, flavors or fragrances
  - Security (anti-counterfeit) feature
  - Technically → valve function: Adjustable filter ventilation, smoke yields & taste



# Cigarette Samples from Hauni Maschinenbau GmbH Hamburg

- Investigation of filter ventilation and smoke dilution properties
- 2 x Tease Tipping & 2 x offline-laser perforation

Sample Number	Perforation Type	Window Shape	Window Dimensions [mm]	Permeability [CU]
1	Die-Cut	1 x Circular	3,30 (diameter)	6650
2	Offline-Laser	4 Rows		1050
3	Die-Cut	1 x Square	2,65 (edge length)	5300
4	Offline-Laser	4 Rows		680

- Virginia Blend Tobacco, 30 CU non-banded (LIP) cigarette paper, 10000 CU plug wrap paper
- 8 mm adhesive-free area underneath the Tipping Paper

# Classification of Cigarette Samples

- Four Tipping Paper sets were made with the same grade of base paper
- Separation according to the two ventilation methods
- Two pairs of cigarette samples, respectively associated via their ventilation levels (marked with different color shades)

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# EXPERIMENTAL RESULTS

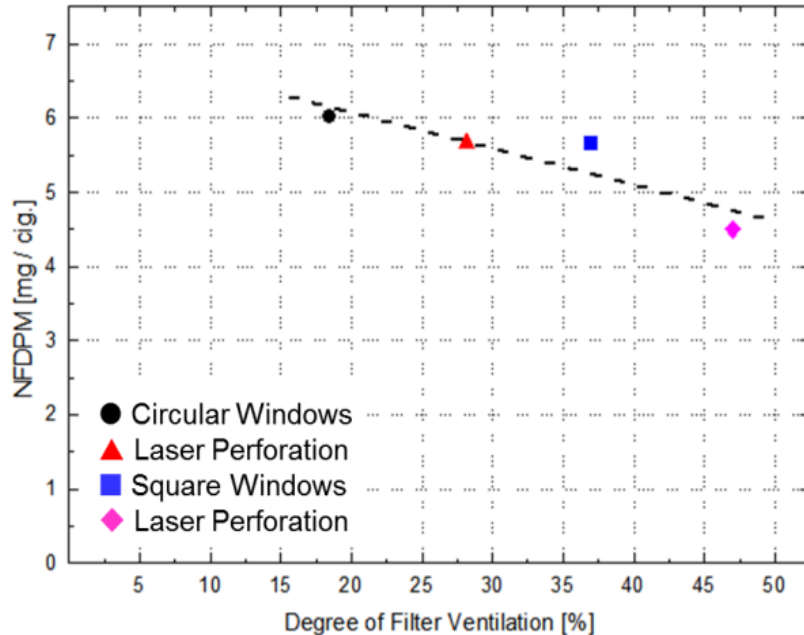


# Filter Ventilation and Smoke Analysis

Sample Number	Perforation Type	Window Shape	Permeability [CU]	CoV of Permeability [%]	Degree of Filter Ventilation [%]	CoV of Filter Ventilation [%]	NFDPM [mg / cig]	Nicotine [mg / cig]	CO [mg / cig]
1	Die-Cut	1 x Circular	6650	0,45	47,03	18,30	4,50	0,64	4,92
2	Offline-Laser	4 Rows	1050	2,19	36,99	16,23	5,65	0,81	6,06
3	Die-Cut	1 x Square	5300	0,33	28,15	16,57	5,67	0,82	6,37
4	Offline-Laser	4 Rows	680	3,13	18,44	14,80	6,02	0,84	6,60

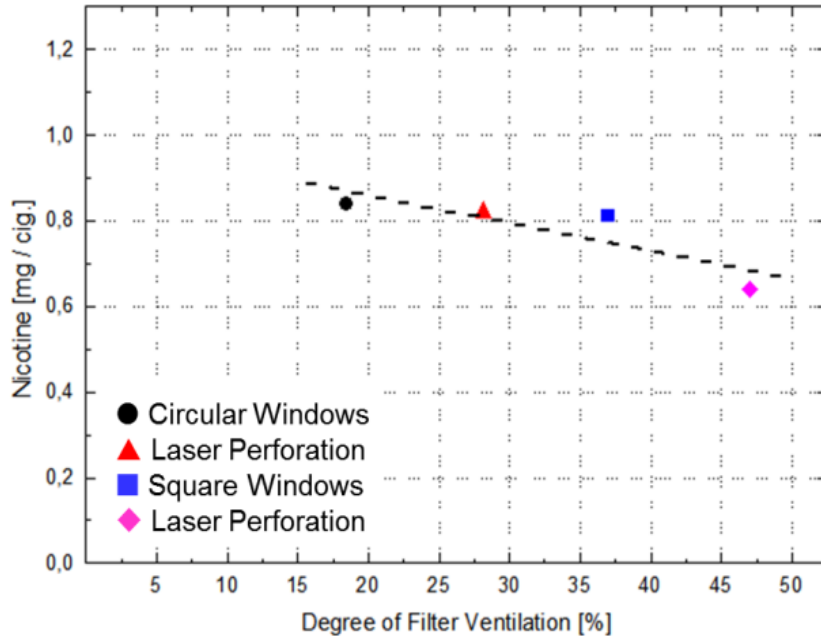
- Relevant parameters: Stability of physical values & basic smoke yields
- Higher stability of the air permeability for Tease Tipping
- Filter ventilation variations are at the same level
- “Remaining permeability” effect demands higher air permeabilities for Tease Tipping to achieve comparable ventilation rates

# Equal NFDPM (“Tar“) Reduction



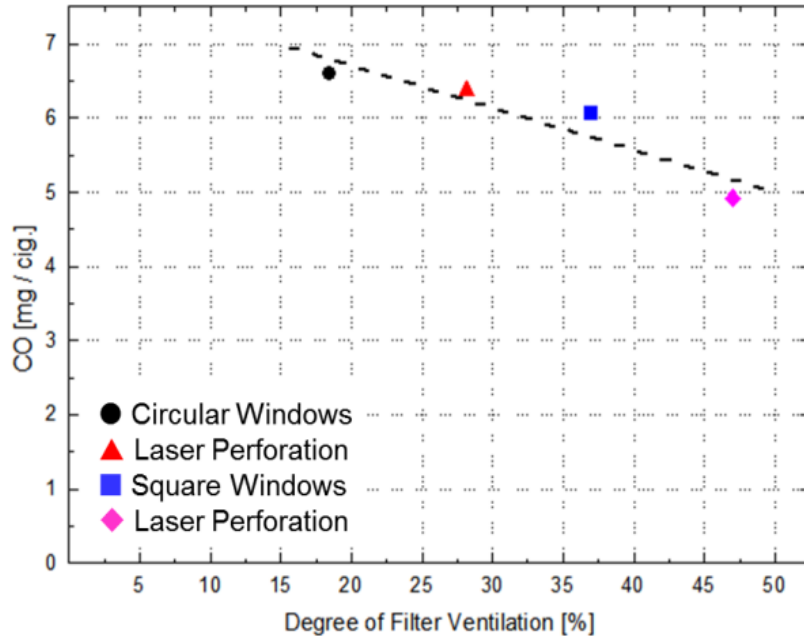
- Results are approximated with linear regression
- With adequate air permeabilities → **same tendency for the tar output** for Tease Tipping and offline-laser perforated Tipping Paper

# Comparable Nicotine Reduction



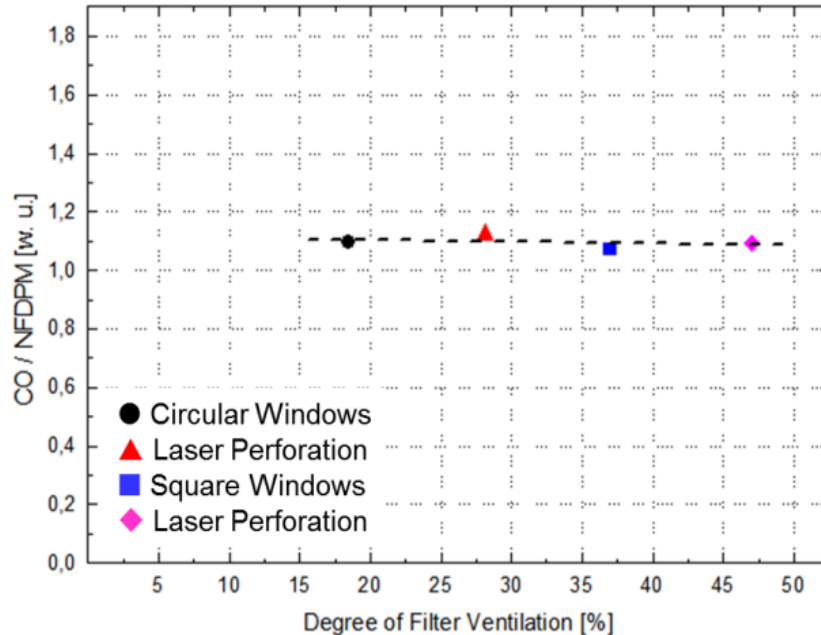
- Like with tar, the reduction of nicotine is controlled by aeration through the Tipping vents
- **Clear correlation** between these technically and geometrically different inspection holes

# Conventional Control of CO



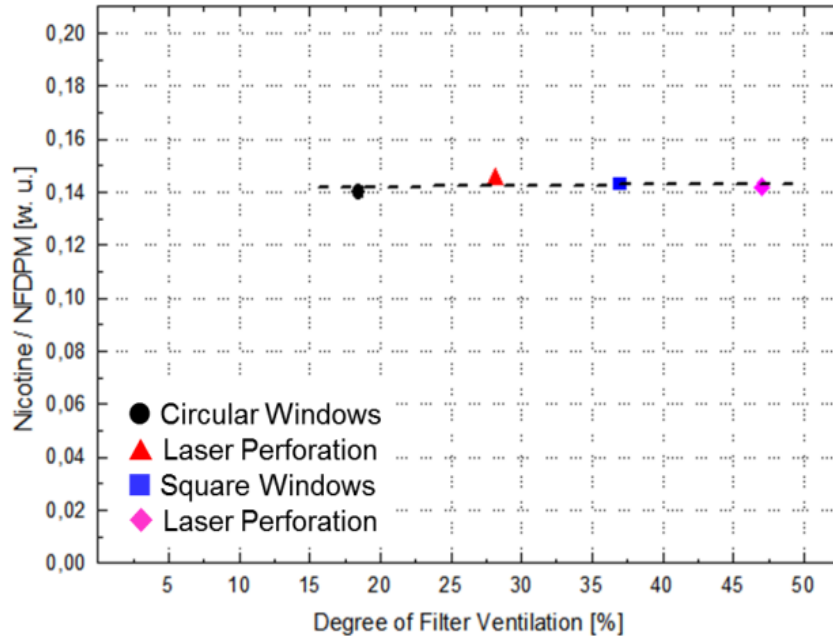
- **CO reduction follows the linear trend** of the two ventilation methods
- No diffusion effects with Tease Tipping and offline-laser perforation (only feasible with Plasma Perforation)

# Homogeneous CO / Tar Ratio



- Essential parameter for smoke quality
- Results for the two perforation types are **at the same level**
- Identical control of the fundamental smoke yields & no diffusion effects

# Uniform Nicotine / Tar Ratio



- **No differences** between the individual nicotine / NFDPM results
- Tease Tipping for smoke dilution purposes is technically equivalent to standard perforation processes

# Summary & Conclusions: Tease Tipping

- Unique alternative to traditionally pre-perforated Tipping Paper
- Die-cutting process with a precise laser or mechanical punching system
- Formation of open windows or macroscopic inspection holes
- Flexible & unlimited hole geometries
- Smart way to ventilate and upgrade the design of filter cigarettes





# Summary & Conclusions: Advantages

- 1<sup>st</sup> benefit of Tease Tipping:  
Equal physical cigarette properties & control of smoke yields as with standard perforation methods
- 2<sup>nd</sup> benefit of Tease Tipping:  
Customized designs of open windows for an outstanding view on particular cigarette filters



TEASE TIPPING – THE PERFECT COMBINATION OF CIGARETTE FUNCTIONALITIES AND APPEALING DESIGN FEATURES

# Thank You for Your Valuable Questions & Feedback!

