

Fine-Cut Tobacco Smoke Analysis: Learnings From Collaborative Studies

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Fine-Cut Tobacco: A Semi-Finished Product



The consumer decides on:

- rolling or tubing
- tobacco blend and type, paper, filter tip
- weight, density and shape



This is different compared to factory-made cigarettes!

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CORESTA Activities



1990

Roll-Your-Own ('RYO') Task Force established

Fine-Cut Tobacco: making practice

	Weight (mg)	Diameter (mm)
Finland	800 (600-1000)	8 (6-8)
France	760 (350-1150)	7.8 (6.0-9.5)
Germany	780 (470-1200)	7.5 (6.2-8.9)
Netherlands	780 (490-1070)	7.6 (6.2-9.2)
Norway	900 (800-1000)	7 (6-8)
UK	490 (240-820)	5.8 (4.4-7.2)

CORESTA Activities



1990

Roll-Your-Own ('RYO') Task Force established

1992

Paper specifications agreed

1998

Making devices/sleeve holder available

1999

CORESTA Roll-Your-Own Report



ISO Activities



2001

ISO 15592-1

“Sampling“

ISO 15592-2

“Atmosphere for conditioning and testing“

2003

ISO 15592-3

“Determination of total particulate matter of smoking articles using a routine analytical smoking machine“

ISO 21147

“Consumer made Articles“

2006

2009

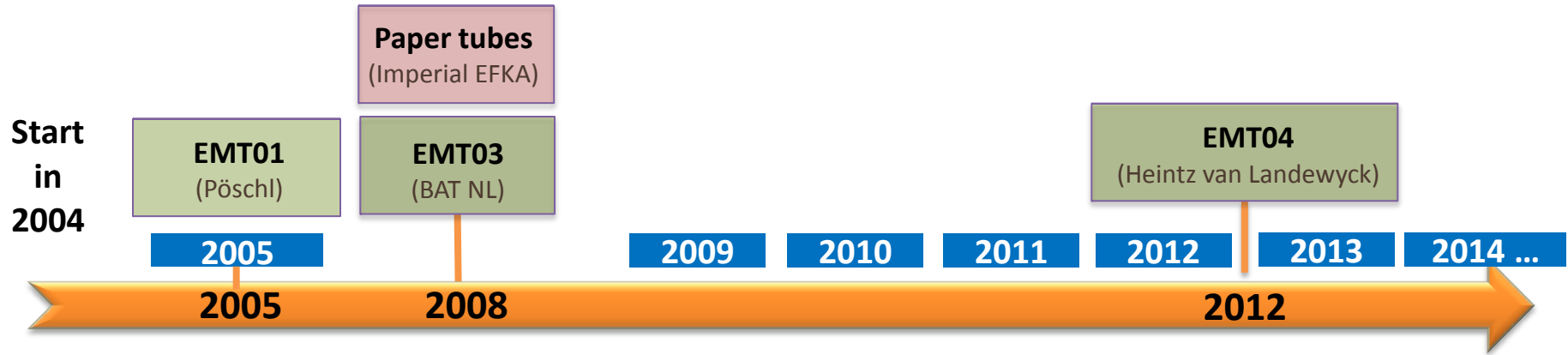
2012

Systematic reviews according to ISO Directives

ESTA Activities

Collaborative Studies on ISO 15592 smoke analysis:

- on an **annual basis**
- to establish mean values for the **ESTA reference material EMT***
- to support laboratory **accreditation (ISO 17025)**



* ESTA Monitor Tobacco

Methodology (ISO 15592)

- **Conditioning**

- Temperature (22 ± 2) °C; relative humidity (75 ± 3) %;

[Cigarettes: Temperature (22 ± 1) °C; relative humidity (60 ± 3) %]

- **Making Process**

- Tobacco in combination with four pre-defined ISO tubes

- two paper specifications
- two diameters with defined tobacco weight
- tolerances for weight of FCSA* ($< \pm 20$ mg) part of ISO standard

- **Machine smoking**

- **Soft mouth end requires a specific holder**

- leads to a fixed butt length of 27mm



Methodology (ISO 15592)



Particular Challenge:

- preparation of FCSAs is a *manual* process that leads to *inherent variation in results* and
- requires intense training of lab staff to prepare FCSAs to meet *acceptable quality* and *specified weight tolerances*

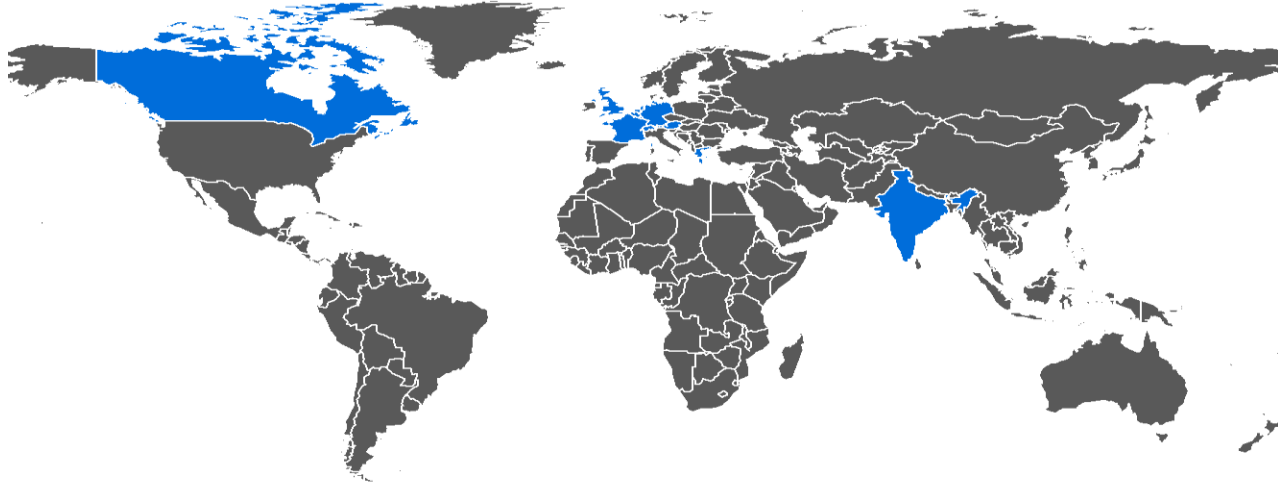
ESTA Collaborative Studies - Objectives

- To establish 'tar' and smoke nicotine yields for the respective EMT currently in use
- To provide a regular overview on repeatability (r) and reproducibility (R) based on a recognised statistical methodology, i.e. ISO 5725
- To provide an independent assessment of the competence of participating laboratories which is required to maintain ISO 17025 accreditation

ESTA Collaborative Studies - Participants

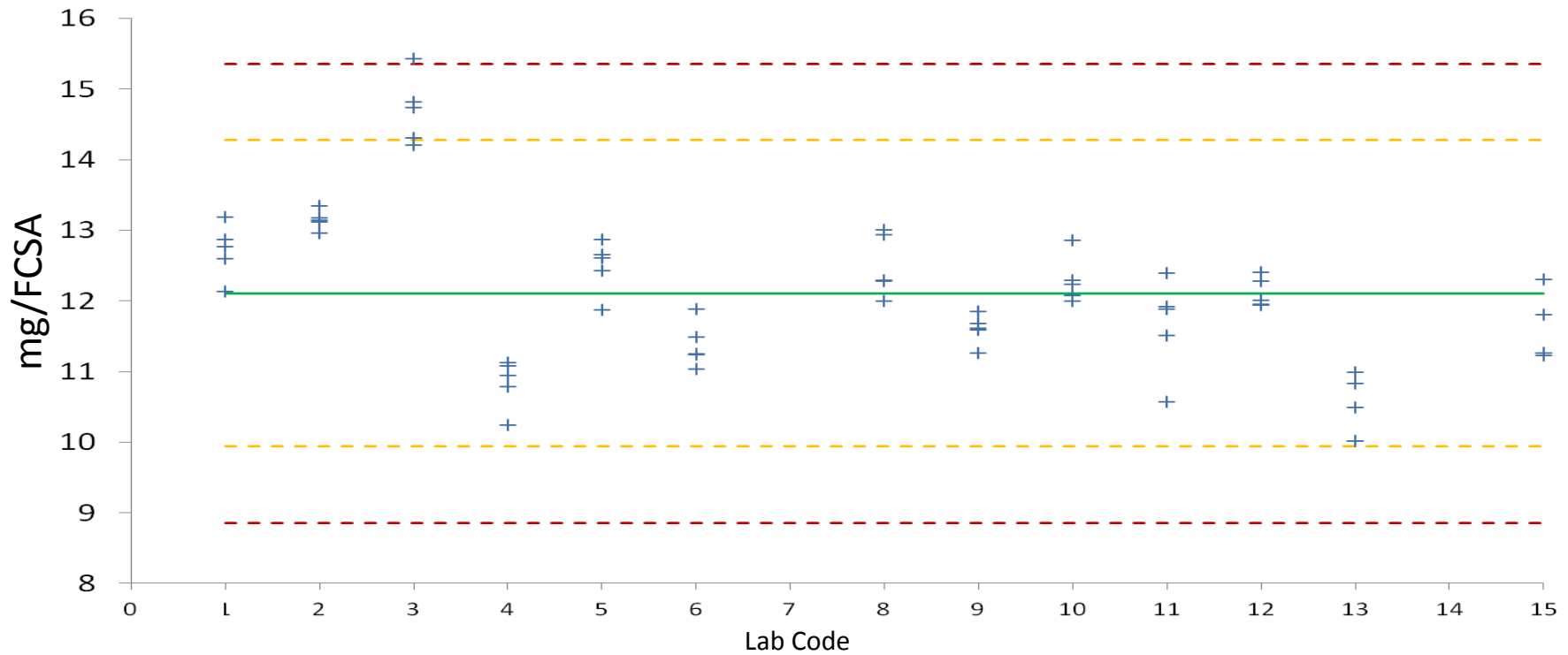
Number of participating laboratories since 2004:

- Tobacco Industry: 18
- Governmental Institutes: 5



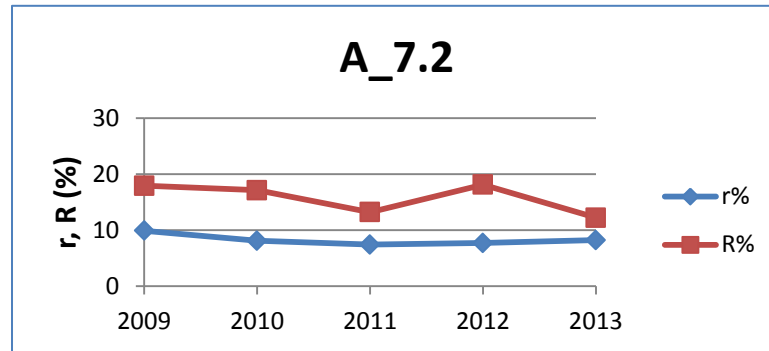
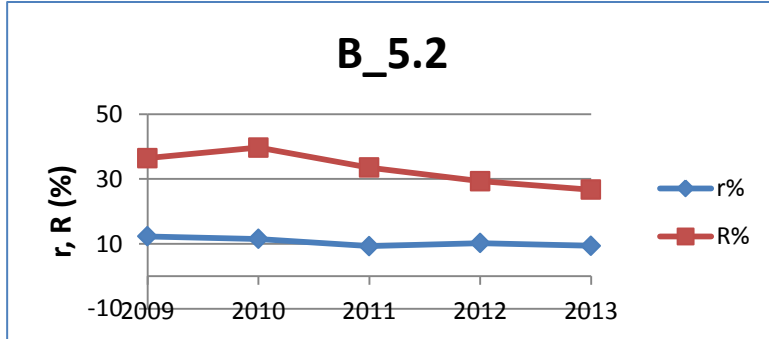
ESTA Collaborative Studies – Example

Data Distribution NFDPM 5.2B (Collaborative Study 2013)



ESTA Collaborative Studies – r and R

NFDPM

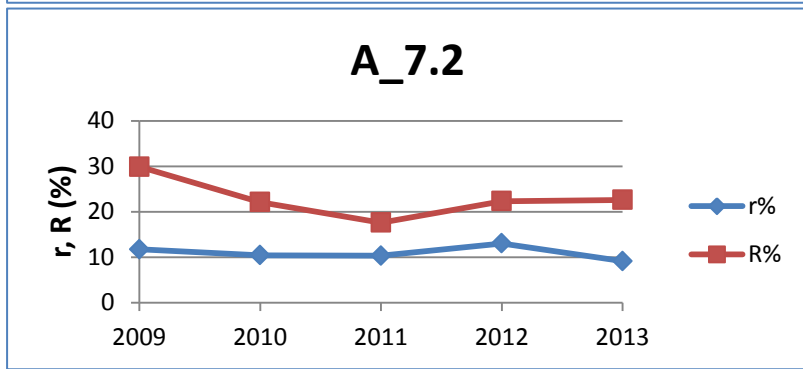
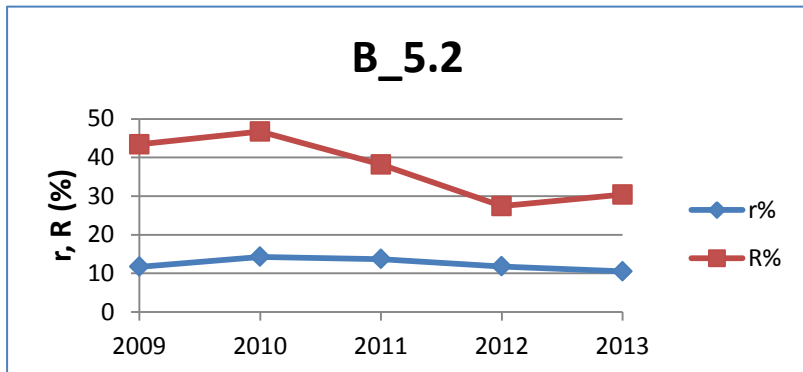


- initial repeatability and reproducibility values are higher than seen in ISO cigarette smoke analysis
- higher r% and R% values for smaller diameters (5.2mm) compared to larger diameter (7.2mm) are due to more difficult handling

Overall, an improvement of the method performance can be seen over the years as the entire process appears to have become under more appropriate control in laboratories

Note: it remained unclear what has caused the increased R% in 2012 for A_7.2

ESTA Collaborative Studies – r and R



Smoke Nicotine basically follows the same trend

Summary

- **Test method for fine-cut tobacco needed in the late 1980's as a response to the regulatory environment and the need to increase the knowledge base for this product category**
- **Complex method development:**
 - **analytical process to overcome complex challenges, i.e. to define and convert semi-finished products (paper and tobacco) into articles fit for machine smoke analysis**
- **Technical work initiated by CORESTA and executed within ISO**

ESTA added-value:

- **monitor tobacco blend**
- **secure of tube and making devices supply**
- **regular collaborative studies**

Learnings

- ***Different*** tobacco product categories require ***specific*** testing methodologies
- These should be based on ***robustly developed*** and ***internationally validated*** methods
- Collaborative work highlights ***potential areas of improvement*** in standard testing methods and ***the way the methods are implemented*** in the labs
- Having a monitor material at hand ***supports laboratories*** to regularly check if their analytical process is under control

Collaborative learning exercise has to continue!



**and its Technical Task Force would welcome
interested laboratories to join the next study!**

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**Many thanks to the Members of the
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