



E-Vapour Sub-Group Update

CORESTA SSPT2021 Virtual Conference

October 2021



E-Vapour Sub-Group Membership

❖ SG Coordinator

- Gene Gillman – JUUL Labs

❖ SG Secretary

- Colin Sinclair – JTI

❖ SG membership

- ≈ 50 people US, EU, Asia
- E-Vapour Product Companies, Suppliers, Contract Labs, Regulatory Agencies, Academia, Others,



E-Vapour Sub-Group

Scope:

- 1) To identify areas of scientific research and conduct studies that will characterize liquids, e-vapour product emissions, and device properties and performance
- 2) To develop and publish methods and guides
- 3) To organize and conduct periodic proficiency/collaborative studies of identified constituents in liquids and/or e-vapour product aerosol



Accomplishments

- ❖ No. 28 - Technical Guide for Setting Method LOD and LOQ Values for the Determination of Metals in E-Liquid and E-Vapour Aerosol by ICP-MS - published on the CORESTA website November 2020
- ❖ 2019 Collaborative Study for the Determination of Formaldehyde and Acetaldehyde in E-Vapour Product Aerosol - published on the CORESTA website November 2020
- ❖ CORESTA Guide No. 18 - Sample Handling and Sample Collection of E-Cigarettes and E-Vapour Generating Products (Second Edition) published on the CORESTA website July 2021
- ❖ CORESTA Recommended Method No. 84 - Determination of Glycerin, Propylene Glycol, Water, and Nicotine in the Aerosol of E-Cigarettes by Gas Chromatographic Analysis (Third Edition) published on the CORESTA website April 2021
- ❖ CORESTA Recommended Method No. 96 - Determination of Formaldehyde and Acetaldehyde in E-Vapour Product Aerosol - published on the CORESTA website February 2021
- ❖ 2019 Collaborative Study: Reference Device for e-Cigarette Aerosol - published on the CORESTA website February 2021
- ❖ Machine Vaping of Electronic Cigarettes – A Comparison of Puffing Regimes (Gupta *et al*) – published in *Contributions to Tobacco and Nicotine Research* July 2021



E-Vapour Sub-Group

❖ Active NWIPs

Project No.	Activity	Leader	Time
312	Metals in e-liquid collaborative study and CRM	Cunningham	Sample distribution
304	TSNAs in e-liquid collaborative study and CRM	Jablonski	Sample distribution



Machine Vaping of Electronic Cigarettes – A Comparison of Puffing Regimes.

DOI: <https://doi.org/10.2478/cttr-2021-0009>

Investigation into the impact of puffing regime on device performance

Results support the puffing regime included in CRM 81



Contributions to Tobacco & Nicotine Research
formerly: Beiträge zur Tabakforschung International
Volume 30 · No. 3 · July 2021
DOI: 10.2478/cttr-2021-0009

Machine Vaping of Electronic Cigarettes - A Comparison of Puffing Regimes^{#,*}

by

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SUMMARY

Several machine-based puffing regimes for collection of e-cigarette aerosol were evaluated with the objective of recommending one regime for standardization. The study involved a comparison of several candidate regimes for which puff volume, duration, interval, profile shape, and puff number were defined and varied. Testing was conducted at four laboratories using seven e-cigarette test products. Each participating laboratory generated and analyzed aerosol from the test products for glycerin, propylene glycol, water, and nicotine using the candidate regimes. Results were compared within each product's data set to understand the impact of the regimes on product yield, consistency of results, and reliability of the testing

ZUSAMMENFASSUNG

Es wurden mehrere maschinelle Zugprotokolle zur Erfassung von E-Zigarettenaerosol mit dem Ziel ausgewertet, eines der Protokolle zur Standardisierung zu empfehlen. Im Rahmen der Untersuchung erfolgte ein Vergleich verschiedener potenziell geeigneter Protokolle, bei denen Volumen, Dauer, Intervall, Profilform und Anzahl der Züge definiert und variiert wurden. Die Untersuchungen wurden in vier Laboren an sieben E-Zigaretten-Testprodukten durchgeführt. Jedes teilnehmende Labor erzeugte mit den Testprodukten Aerosol und analysierte für die verschiedenen Protokollkandidaten den Gehalt an Glycerin, Propylenglykol, Wasser und Nikotin. Die Ergebnisse wurden jeweils innerhalb der produktspezifischen Datensätze verifiziert.



Metals LOD/LOQ

Approved NWIP



❖ Metals LOD/LOQ

- Filter pad-based trapping systems contain some analytes of interest.
- Other trapping system may also contain some analytes of interest.
- Reported values are impacted by trapping system
 - Recommended best practice for determining method LOD/LOQ values
 - Recommended best practice to handle contribution from trapping system

Published November 2020

✓ **Project Completed**



Carbonyl Method

Aerosol



Carbonyls in Aerosol

Study Coordinator - Gene Gillman (Enthalpy)

Statistical Analysis - Mike Morton (Altria)

Method Selection - HPLC with DNPH

Phase I – Liquid (Completed), Technical report published

Phase II – Emissions (Small Group Study 2018)

- ✓ Spiked liquid transfer study with four SG members
- ✓ Device and liquid selection

Phase III – Collaborative study (2019)

- ✓ In house spiked liquids and standardized device



Carbonyls in Aerosol

Method Selection: HPLC with DNPH

Study Protocol

- **Harmonized Device: Aspire Tank and Evolv DNA power supply**
- **Compounds included: formaldehyde and acetaldehyde**
- **Three e-liquids, unflavored, tobacco and menthol**
- **Samples fortified at three levels (0, 15, 25 and 35 $\mu\text{g}/\text{ml}$) immediately before analysis**
- **Aerosol samples collected using 55/3/30 CORESTA CRM 81 puffing**
- **Collected ~300 mg of aerosol per liquid and spiking level, in triplicate**



Carbonyls in Aerosol

- Technical Report published
- CRM published
- ✓ **Project completed!**



Primary Constituents in Aerosol Reference Device Study

Approved NWIP 203



Reference Devices

Study Coordinator - Randy Weidman (RJR)

Statistical Analysis - Mike Morton (Altria)

Method Selection – CRM 81 and CRM 84

Study Protocol

- **Harmonized Device: Aspire Tank and Evolv DNA power supply**
- **Compounds included: nicotine, propylene glycol, glycerin @ water**
- **Three e-liquids, unflavored, tobacco and menthol**



❖ E-vapour emission methods require suitable reference devices

- Reference devices needed for future collaborative studies
- Technical report published
- CRM 84 updated and revised version released

✓ **Project completed!**

The Nautilus tank is available to order from Borgwaldt KC

Power supply is available from Evolv. Note: Shipping times may be impacted



Update to Guide 18

NWIP 298

- **Project Lead- Cyril Jeannet (PMI)**
 - **Technical Guide for Sample Handling and Sample Collection of E-Cigarettes and E-Vapour Generating Products**
 - **Last updated November 2016**
 - **Updated version circulated to the SG March 2021, comments received and revised version published.**
- ✓ **Project completed!**



Comparison of Puffing Parameters – Peer-Reviewed Publication

Approved NWIP



❖ Publication Status

- **Manuscript submitted for CORESTA review July 2020**
 - SC Comments received September 2020
 - Board Comments received November 2020
- **Manuscript submitted to Contributions to Tobacco Research November 2020**
 - Reviewer Comments received January 2021
 - Accepted for Publication March 2021
 - Published July 2021

✓ Project Completed



Two-year plan for the group

- ❖ **Metals in e-liquid: collaborative study with CRM**
- ❖ **TSNAs in e-liquid: collaborative study with CRM**
- ❖ **Organic acids – methods review**
- ❖ **Glycidol: collaborative study with CRM**
- ❖ **Flavors**
- ❖ **Reference Tank product, coordinating supply for ongoing and future studies.**