



Testing Performed by:



## Electronic Cigarettes/E-Cigarette Refill Container Emissions Report

Analytical Summary Report in Support of the European Tobacco  
Product Directive (2014/40/EU) Article 20

### Product Details

<b>Product Form:</b>	Device (E-Cigarette)
<b>Brand:</b>	Vaporesso Target Mini Kit
<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg
<b>Strength:</b>	12mg/ml
<b>Bottle Size:</b>	N/A (Device)
<b>SKU:</b>	N/A
<b>Batch Tested:</b>	VSGV16660616
<b>Nerudia Job Ref:</b>	N/A
<b>Client Name:</b>	Nerudia

**Approved By:** Lynne Hessel  
**User ID:** LHessel  
**Title:** Quality and Business Systems Manager

**Approved Date:** 20-September-2016



Client Name:	Nerudia	Brand:	Vaporesso Target Mini
Description:	Target Mini (0.5ohm)+vPure12mg	SKU:	Kit N/A
Nerudia Job Ref:	N/A	Strength:	12mg/ml
Batch Number:	VSGV16660616	Bottle Size:	N/A (Device)

Emissions Data Summary

Component	Result	Units	CAS No	Description
Formaldehyde	0.6	µg/ten inhalations	50-00-0	Carbonyls in Emissions by HPLC-MS
Acetaldehyde	4.0	µg/ten inhalations	75-07-0	Carbonyls in Emissions by HPLC-MS
Propionaldehyde	0.2	µg/ten inhalations	123-38-6	Carbonyls in Emissions by HPLC-MS
Acrolein	0.3	µg/ten inhalations	107-02-8	Carbonyls in Emissions by HPLC-MS
Silicon	2.2	µg/ten inhalations	7440-21-3	Metals in Emissions by ICP-MS, ICP-OES and Mercury Analyser
Nicotine	1381.0	µg/ten inhalations	54-11-5	Nicotine Dose by HPLC-UV
Dose Consistency - Deviation from Mean	16.0	%	N/A	Nicotine Dose by HPLC-UV
Aerosol Mass	219250.0	µg/ten inhalations	N/A	Nicotine Dose by HPLC-UV

This summary table only includes components that have been detected during emissions testing. For full details of the components tested and the individual values refer to the Analytical Summary section.

Approved By:	Lynne Hessel	Approved Date:	20-September-2016
User ID:	LHessel		
Title:	Quality and Business Systems Manager		

This sample has been approved by electronic signature functionality, which the approver uses as the legally-binding equivalent of a hand-written signature.

<b>Client Name:</b>	Nerudia	<b>Brand:</b>	Vaporesso Target Mini
<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

## Analytical Method Parameters

The following tables detail the parameters utilised during the collection of the product emissions.

<b>Approved By:</b>	Lynne Hessel	<b>Approved Date:</b>	20-September-2016
<b>User ID:</b>	LHessel		
<b>Title:</b>	Quality and Business Systems Manager		

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**Client Name:** Nerudia

**Description:** Target Mini (0.5ohm)+vPure12mg

**Nerudia Job Ref:** N/A

**Batch Number:** VSGV16660616

**Brand:** Vaporesso Target Mini

**SKU:** Kit  
N/A

**Strength:** 12mg/ml

**Bottle Size:** N/A (Device)

## Analytical Method Parameters

Test Method	Metals in Emissions by ICP-MS, ICP-OES and Mercury Analyser
Inhalation Numbers - Prep 1 Start	11 to 60
Inhalation Numbers - Prep 1 Middle	61 to 110
Inhalation Numbers - Prep 1 End	111 to 160
Inhalation Numbers - Prep 2 Start	1 to 50
Inhalation Numbers - Prep 2 Middle	51 to 100
Inhalation Numbers - Prep 2 End	101 to 150
E-liquid EC-ID (if available)	NA
E-Liquid Manufacturer	Vype
E-Liquid Brand/Flavour/Strength	VPure/Neutral/12mg
E-Liquid available on the European Market	Yes
Device Power Setting	40 Watt
Inhalation Volume (ml)	55
Inhalation Interval (Seconds)	30
Inhalation Time (Seconds)	3
Inhalation Profile	Square Wave
Inhalation Flow Rate (L/min)	1.10

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**Title:** Quality and Business Systems Manager

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**Client Name:** Nerudia

**Description:** Target Mini (0.5ohm)+vPure12mg

**Nerudia Job Ref:** N/A

**Batch Number:** VSGV16660616

**Brand:** Vaporesso Target Mini

**SKU:** Kit  
N/A

**Strength:** 12mg/ml

**Bottle Size:** N/A (Device)

## Analytical Method Parameters

Test Method	Carbonyls in Emissions by HPLC-MS
Inhalation Numbers - Prep 1 Start	11 to 20
Inhalation Numbers - Prep 1 Middle	46 to 55
Inhalation Numbers - Prep 1 End	56 to 75
Inhalation Numbers - Prep 2 Start	11 to 20
Inhalation Numbers - Prep 2 Middle	41 to 50
Inhalation Numbers - Prep 2 End	66 to 75
E-liquid EC-ID (if available)	NA
E-Liquid Manufacturer	Vype
E-Liquid Brand/Flavour/Strength	VPure/Neutral/12mg
E-Liquid available on the European Market	Yes
Device Power Setting	40 Watt
Inhalation Volume (ml)	55
Inhalation Interval (Seconds)	30
Inhalation Time (Seconds)	3
Inhalation Profile	Square Wave
Inhalation Flow Rate (L/min)	1.10

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<b>Client Name:</b>	Nerudia	<b>Brand:</b>	Vaporesso Target Mini
<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

## Analytical Data

The following tables detail all analytical data points generated during the emissions study including calculated mean values.

<b>Approved By:</b>	Lynne Hessel	<b>Approved Date:</b>	20-September-2016
<b>User ID:</b>	LHessel		
<b>Title:</b>	Quality and Business Systems Manager		

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**Client Name:** Nerudia

**Description:** Target Mini (0.5ohm)+vPure12mg

**Nerudia Job Ref:** N/A

**Batch Number:** VSGV16660616

**Brand:** Vaporesso Target Mini

**SKU:** Kit N/A

**Strength:** 12mg/ml

**Bottle Size:** N/A (Device)

## Analytical Data

**Method:** Carbonyls in Emissions by HPLC-MS

Component	Value	Units	Reporting Threshold
Formaldehyde Start Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Formaldehyde Middle Replicate 1	2.4	µg/ten inhalations	1.0 µg/ten inhalations
Formaldehyde End Replicate 1	2.2	µg/ten inhalations	1.0 µg/ten inhalations
Formaldehyde Start Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Formaldehyde Middle Replicate 2	1.1	µg/ten inhalations	1.0 µg/ten inhalations
Formaldehyde End Replicate 2	10.1	µg/ten inhalations	1.0 µg/ten inhalations
<b>Formaldehyde Mean Replicate 1</b>	<b>1.5</b>	<b>µg/ten inhalations</b>	
<b>Formaldehyde Mean Replicate 2</b>	<b>3.7</b>	<b>µg/ten inhalations</b>	
<b>Formaldehyde Mean</b>	<b>0.6</b>	<b>µg/ten inhalations</b>	
Acetaldehyde Start Replicate 1	3.7	µg/ten inhalations	1.0 µg/ten inhalations
Acetaldehyde Middle Replicate 1	2.7	µg/ten inhalations	1.0 µg/ten inhalations
Acetaldehyde End Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Acetaldehyde Start Replicate 2	2.0	µg/ten inhalations	1.0 µg/ten inhalations
Acetaldehyde Middle Replicate 2	1.1	µg/ten inhalations	1.0 µg/ten inhalations
Acetaldehyde End Replicate 2	14.8	µg/ten inhalations	1.0 µg/ten inhalations
<b>Acetaldehyde Mean Replicate 1</b>	<b>2.1</b>	<b>µg/ten inhalations</b>	
<b>Acetaldehyde Mean Replicate 2</b>	<b>6.0</b>	<b>µg/ten inhalations</b>	
<b>Acetaldehyde Mean</b>	<b>4.0</b>	<b>µg/ten inhalations</b>	
Propionaldehyde Start Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Propionaldehyde Middle Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations

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<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

Propionaldehyde End Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Propionaldehyde Start Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Propionaldehyde Middle Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Propionaldehyde End Replicate 2	1.4	µg/ten inhalations	1.0 µg/ten inhalations
<b>Propionaldehyde Mean Replicate 1</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
<b>Propionaldehyde Mean Replicate 2</b>	<b>0.5</b>	<b>µg/ten inhalations</b>	
<b>Propionaldehyde Mean</b>	<b>0.2</b>	<b>µg/ten inhalations</b>	
Acrolein Start Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Acrolein Middle Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Acrolein End Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Acrolein Start Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Acrolein Middle Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Acrolein End Replicate 2	1.9	µg/ten inhalations	1.0 µg/ten inhalations
<b>Acrolein Mean Replicate 1</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
<b>Acrolein Mean Replicate 2</b>	<b>0.6</b>	<b>µg/ten inhalations</b>	
<b>Acrolein Mean</b>	<b>0.3</b>	<b>µg/ten inhalations</b>	
Crotonaldehyde Start Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Crotonaldehyde Middle Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Crotonaldehyde End Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Crotonaldehyde Start Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Crotonaldehyde Middle Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Crotonaldehyde End Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
<b>Crotonaldehyde Mean Replicate 1</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
<b>Crotonaldehyde Mean Replicate 2</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
<b>Crotonaldehyde Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	

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<b>Client Name:</b>	Nerudia	<b>Brand:</b>	Vaporesso Target Mini
<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

Butyraldehyde Start Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Butyraldehyde Middle Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Butyraldehyde End Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Butyraldehyde Start Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Butyraldehyde Middle Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Butyraldehyde End Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
<b>Butyraldehyde Mean Replicate 1</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
<b>Butyraldehyde Mean Replicate 2</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
<b>Butyraldehyde Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Acetylpropionyl (2,3-pentanedione) Start Rep 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Acetylpropionyl (2,3-pentanedione) Middle Rep 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Acetylpropionyl (2,3-pentanedione) End Rep 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Acetylpropionyl (2,3-pentanedione) Start Rep 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Acetylpropionyl (2,3-pentanedione) Middle Rep 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Acetylpropionyl (2,3-pentanedione) End Rep 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
<b>Acetylpropionyl (2,3-pentanedione) Mean Rep 1</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
<b>Acetylpropionyl (2,3-pentanedione) Mean Rep 2</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
<b>Acetylpropionyl (2,3-pentanedione) Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Diacetyl (butane-2,3-dione) Start Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Diacetyl (butane-2,3-dione) Middle Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Diacetyl (butane-2,3-dione) End Replicate 1	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Diacetyl (butane-2,3-dione) Start Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Diacetyl (butane-2,3-dione) Middle Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
Diacetyl (butane-2,3-dione) End Replicate 2	Not Detected	µg/ten inhalations	1.0 µg/ten inhalations
<b>Diacetyl (butane-2,3-dione) Mean Replicate 1</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	

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<b>Client Name:</b>	Nerudia	<b>Brand:</b>	Vaporesso Target Mini
<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

<b>Diacetyl (butane-2,3-dione) Mean Replicate 2</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>
<b>Diacetyl (butane-2,3-dione) Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>

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**Client Name:** Nerudia

**Description:** Target Mini (0.5ohm)+vPure12mg

**Nerudia Job Ref:** N/A

**Batch Number:** VSGV16660616

**Brand:** Vaporesso Target Mini

**SKU:** Kit N/A

**Strength:** 12mg/ml

**Bottle Size:** N/A (Device)

## Analytical Data

**Method:** Metals in Emissions by ICP-MS, ICP-OES and Mercury Analyser

Component	Value	Units	Reporting Threshold
Mercury Start	Not Detected	µg/ten inhalations	0.01 µg/ten inhalations
Mercury Middle	Not Detected	µg/ten inhalations	0.01 µg/ten inhalations
Mercury End	Not Detected	µg/ten inhalations	0.01 µg/ten inhalations
<b>Mercury Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Arsenic Start	Not Detected	µg/ten inhalations	0.02 µg/ten inhalations
Arsenic Middle	Not Detected	µg/ten inhalations	0.02 µg/ten inhalations
Arsenic End	Not Detected	µg/ten inhalations	0.02 µg/ten inhalations
<b>Arsenic Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Cadmium Start	Not Detected	µg/ten inhalations	0.02 µg/ten inhalations
Cadmium Middle	Not Detected	µg/ten inhalations	0.02 µg/ten inhalations
Cadmium End	Not Detected	µg/ten inhalations	0.02 µg/ten inhalations
<b>Cadmium Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Iron Start	Not Detected	µg/ten inhalations	13.0 µg/ten inhalations
Iron Middle	Not Detected	µg/ten inhalations	13.0 µg/ten inhalations
Iron End	Not Detected	µg/ten inhalations	13.0 µg/ten inhalations
<b>Iron Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Lead Start	Not Detected	µg/ten inhalations	0.05 µg/ten inhalations
Lead Middle	Not Detected	µg/ten inhalations	0.05 µg/ten inhalations
Lead End	Not Detected	µg/ten inhalations	0.05 µg/ten inhalations
<b>Lead Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	

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<b>Client Name:</b>	Nerudia	<b>Brand:</b>	Vaporesso Target Mini
<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

Nickel Start	Not Detected	µg/ten inhalations	0.05 µg/ten inhalations
Nickel Middle	Not Detected	µg/ten inhalations	0.05 µg/ten inhalations
Nickel End	Not Detected	µg/ten inhalations	0.05 µg/ten inhalations
<b>Nickel Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Aluminium Start	Not Detected	µg/ten inhalations	0.10 µg/ten inhalations
Aluminium Middle	Not Detected	µg/ten inhalations	0.10 µg/ten inhalations
Aluminium End	Not Detected	µg/ten inhalations	0.10 µg/ten inhalations
<b>Aluminium Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Silicon Start	3.7	µg/ten inhalations	0.125 µg/ten inhalations
Silicon Middle	1.9	µg/ten inhalations	0.125 µg/ten inhalations
Silicon End	1.0	µg/ten inhalations	0.125 µg/ten inhalations
<b>Silicon Mean</b>	<b>2.2</b>	<b>µg/ten inhalations</b>	
Tin Start	Not Detected	µg/ten inhalations	0.02 µg/ten inhalations
Tin Middle	Not Detected	µg/ten inhalations	0.02 µg/ten inhalations
Tin End	Not Detected	µg/ten inhalations	0.02 µg/ten inhalations
<b>Tin Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Vanadium Start	Not Detected	µg/ten inhalations	0.01 µg/ten inhalations
Vanadium Middle	Not Detected	µg/ten inhalations	0.01 µg/ten inhalations
Vanadium End	Not Detected	µg/ten inhalations	0.01 µg/ten inhalations
<b>Vanadium Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Cobolt Start	Not Detected	µg/ten inhalations	0.03 µg/ten inhalations
Cobolt Middle	Not Detected	µg/ten inhalations	0.03 µg/ten inhalations
Cobolt End	Not Detected	µg/ten inhalations	0.03 µg/ten inhalations
<b>Cobolt Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Molybdenum Start	Not Detected	µg/ten inhalations	0.10 µg/ten inhalations

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<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

Molybdenum Middle	Not Detected	µg/ten inhalations	0.10 µg/ten inhalations
Molybdenum End	Not Detected	µg/ten inhalations	0.10 µg/ten inhalations
<b>Molybdenum Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Antimony Start	Not Detected	µg/ten inhalations	0.20 µg/ten inhalations
Antimony Middle	Not Detected	µg/ten inhalations	0.20 µg/ten inhalations
Antimony End	Not Detected	µg/ten inhalations	0.20 µg/ten inhalations
<b>Antimony Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Chromium Start	Not Detected	µg/ten inhalations	0.03 µg/ten inhalations
Chromium Middle	Not Detected	µg/ten inhalations	0.03 µg/ten inhalations
Chromium End	Not Detected	µg/ten inhalations	0.03 µg/ten inhalations
<b>Chromium Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	
Copper Start	Not Detected	µg/ten inhalations	0.30 µg/ten inhalations
Copper Middle	Not Detected	µg/ten inhalations	0.30 µg/ten inhalations
Copper End	Not Detected	µg/ten inhalations	0.30 µg/ten inhalations
<b>Copper Mean</b>	<b>Not Detected</b>	<b>µg/ten inhalations</b>	

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**Client Name:** Nerudia  
**Description:** Target Mini (0.5ohm)+vPure12mg  
**Nerudia Job Ref:** N/A  
**Batch Number:** VSGV16660616

**Brand:** Vaporesso Target Mini  
**SKU:** Kit  
N/A  
**Strength:** 12mg/ml  
**Bottle Size:** N/A (Device)

## Analytical Data

**Method:** Nicotine Dose by HPLC-UV

Component	Value	Units	Reporting Threshold
Nicotine Mean	1381.0	µg/ten inhalations	0.1 µg/ten inhalations
Nicotine Maximum Deviation from Mean	16.0	%	
Mean Aerosol Mass	219250.0	µg/ten inhalations	

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<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

# Analytical Method Summary

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<b>Title:</b>	Quality and Business Systems Manager		

This sample has been approved by electronic signature functionality, which the approver uses as the legally-binding equivalent of a hand-written signature.

<b>Client Name:</b>	Nerudia	<b>Brand:</b>	Vaporesso Target Mini
<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

## Method Title: Emissions - The Determination Of Carbonyl Compounds In Aerosol

### Overview

During the vapourisation process, the e-liquid is heated to temperatures often exceeding 300°C. These temperatures are sufficiently high to induce physical changes of e-liquids and chemical reactions between the constituents of e-liquids. Solvents contained in the nicotine formulation may undergo pyrolysis leading to formation of potentially toxic compounds.

Both glycerol and propylene glycol have been shown to thermally decompose at high temperatures generating low molecular weight carbonyl compounds with established toxic properties (e.g., formaldehyde, acetaldehyde and acrolein). The operating conditions of the e-cigarette device plays a pivotal role in determining the rate at which carbonyl compounds are produced during e-cigarette use. In addition, it is also known that the higher the propylene glycol content in the e-liquid, the greater the chance that higher levels of carbonyls will be detected in the vapour.

The method is designed to generate a known amount of aerosol under controlled sampling conditions from a specified e-liquid / e-cigarette combination, which is then captured in a derivatisation solution. (Derivatisation is a procedural technique that is required to modify the carbonyl compounds functionality in order to enable chromatographic separation and detection). The resulting liquid samples are stabilised and then analysed using high performance liquid chromatography with tandem mass spectrophotometric detection (HPLC-MS/MS).

<b>Approved By:</b>	Lynne Hessel	<b>Approved Date:</b>	20-September-2016
<b>User ID:</b>	LHessel		
<b>Title:</b>	Quality and Business Systems Manager		

This sample has been approved by electronic signature functionality, which the approver uses as the legally-binding equivalent of a hand-written signature.



**Client Name:** Nerudia

**Description:** Target Mini (0.5ohm)+vPure12mg

**Nerudia Job Ref:** N/A

**Batch Number:** VSGV16660616

**Brand:** Vaporesso Target Mini

**SKU:** Kit  
N/A

**Strength:** 12mg/ml

**Bottle Size:** N/A (Device)

## Target Analytes

The following is a list of carbonyl compounds which may be produced from e-cigarettes during normal or reasonably foreseeable conditions.

Name	CAS N°	IARC Monograph Group*
<b>Formaldehyde</b>	50-00-0	Group 1
<b>Acetaldehyde</b>	75-07-0	Group 2B
<b>Propionaldehyde</b>	123-38-6	Group 3
<b>Acrolein</b>	107-02-8	Group 3
<b>Crotonaldehyde</b>	123-73-9	Group 3
<b>Butryaldehyde</b>	123-72-8	N/A
<b>Diacetyl</b>	431-03-8	N/A
<b>Acetylpropionyl</b>	600-14-6	N/A

\* IARC is the International Agency for Research on Cancer, an agency of the World Health Organization (WHO). IARC classifies carcinogens in five categories ranging from carcinogenic to humans (Group 1) to probably not carcinogenic to humans (Group 4). For more information please visit <http://monographs.iarc.fr/>

To date, there is no official guidance on appropriate toxicological safe levels of carbonyls permitted in e-cigarette vapour. To establish appropriate limits of detection / quantification (LOD / LOQ) levels for the analytical methodology, the following table outlines an interpretation of permitted daily occupational exposure limits as defined by the United States Department of Labor, Occupational Safety and Health Administration (OSHA) [https://www.osha.gov/dts/chemicalsampling/toc.toc\\_chemsamp.html](https://www.osha.gov/dts/chemicalsampling/toc.toc_chemsamp.html). Where multiple limits are defined (e.g. by industry), the lower limit has been used in all cases. For the purposes of correlating exposure limits relative to daily e-cigarette usage, a maximum of 500 inhalations per day has been defined as 'normal or reasonably foreseeable conditions'. An 'alert limit' of 50% of the PEL (Permitted Exposure Limit) has been established as a guide.

**Approved By:** Lynne Hessel

**User ID:** LHessel

**Title:** Quality and Business Systems Manager

**Approved Date:** 20-September-2016

This sample has been approved by electronic signature functionality, which the approver uses as the legally-binding equivalent of a hand-written signature.

**Client Name:** Nerudia

**Description:** Target Mini (0.5ohm)+vPure12mg

**Nerudia Job Ref:** N/A

**Batch Number:** VSGV16660616

**Brand:** Vaporesso Target Mini

**SKU:** Kit  
N/A

**Strength:** 12mg/ml

**Bottle Size:** N/A (Device)

Name	Maximum PEL (mg)	Alert Limit 50% of PEL (µg/ day 500 inhalations)	Alert Limit 50% of PEL (µg/ 10 inhalations)	Reporting Threshold (µg/ 10 inhalations)
Formaldehyde	0.1	57.0	1.1	1.0
Acetaldehyde	261.3	130626.2	2612.5	1.0
Propionaldehyde	276	137824.1	2756.5	1.0
Acrolein	1.3	664.9	13.3	1.0
Crotonaldehyde	5.0	2494.0	49.9	1.0
Butryaldehyde	427.6	213793.5	4275.9	1.0
Diacetyl*	0.2	83.1	1.7	1.0
Acetylpropionyl*	11.9	5936.4	118.7	1.0

PEL = Permitted Exposure Limit

\* The detection of diacetyl and acetylpropionyl will be on a limit test basis only - i.e. methodology will confirm absence in the emissions below a specified level.

**Approved By:** Lynne Hessel

**User ID:** LHessel

**Title:** Quality and Business Systems Manager

**Approved Date:** 20-September-2016

This sample has been approved by electronic signature functionality, which the approver uses as the legally-binding equivalent of a hand-written signature.

**Client Name:** Nerudia

**Description:** Target Mini (0.5ohm)+vPure12mg

**Nerudia Job Ref:** N/A

**Batch Number:** VSGV16660616

**Brand:** Vaporesso Target Mini

**SKU:** Kit N/A

**Strength:** 12mg/ml

**Bottle Size:** N/A (Device)

## Methodology References

Method Reference	Reference Title
<b>CORESTA RECOMMENDED METHOD N° 81</b>	Routine Analytical Machine For E-Cigarette Aerosol Generation And Collection – Definitions And Standard Conditions (June 2015)
<b>ISO 7210:2013</b>	Routine Analytical Cigarette-Smoking Machine – Additional Test Methods For Machine Verification
<b>ISO 3308:2012</b>	Routine Analytical Cigarette-Smoking Machine – Definitions And Standard Conditions
<b>ISO 558:1980</b>	Conditioning And Testing – Standard Atmospheres - Definitions
<b>United States Department of Labor, Occupational Safety and Health Administration</b>	Chemical Sampling Information
<b>CORESTA RECOMMENDED METHOD N° 74</b>	Determination of Selected Carbonyls in Mainstream Cigarette Smoke By HPLC (July 2014)
<b>Nicotine &amp; Tobacco Research, Volume 17, Issue 2 Pg. 168-174</b>	Evaluation of electronic cigarette liquids and vapour for the presence of selected inhalation toxins. <i>Farsalinos et al</i>
<b>Nicotine &amp; Tobacco Research, Volume 16, Number 10 (October 2014) 1319-1326</b>	Carbonyl Compounds in Electronic Cigarette Vapors: Effects of Nicotine Solvent and Battery Output Voltage <i>Kosminder et al</i>
<b>Tob Control. 2014 March ; 23(2): 133-139</b>	Levels of selected carcinogens and toxicants in vapor from electronic cigarettes <i>Goniewicz et al</i>
<b>AFNOR XP D90-300-2</b>	Cigarettes électroniques et eliquides
<b>Journal of Regulatory Toxicology and Pharmacology 75 (2016) 58-65</b>	Effect Of Variable Power Levels On The Yield Of Total Aerosol Mass And Formation Of Aldehydes In e-Cigarette Aerosols <i>Gillman et al</i>
<b>CORESTA Task Force Technical Report</b>	2014 Electronic Cigarette Aerosol Parameters Study

**Approved By:** Lynne Hessel

**User ID:** LHessel

**Title:** Quality and Business Systems Manager

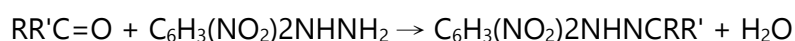
**Approved Date:** 20-September-2016

This sample has been approved by electronic signature functionality, which the approver uses as the legally-binding equivalent of a hand-written signature.

<b>Client Name:</b>	Nerudia	<b>Brand:</b>	Vaporesso Target Mini
<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

## Method Principles

The materials (e-cigarette devices or e-liquid) under test will be operated under controlled environmental conditions using an automated vaping machine. 10 inhalations from each sample will be generated at the start, middle and end of the device (a complete tank refill or cartridge). The aerosol generated for each set of 10 inhalations will be collected into an acidified derivatisation solution containing 2,4-dinitrophenylhydrazine. This solution efficiently traps the aerosol and simultaneously converts the carbonyl compounds into a hydrazone species according to the following equation:



The conversion to a hydrazone form enables the original carbonyls to be detected at very low concentrations while improving the method selectivity. The acidified solution is subsequently neutralized to quench the reaction described above. Aliquots of the collected samples are then analysed by HPLC-MS/MS. To compensate for the highly variable matrix components which can cause significant modification of ionization in the mass spectrometer, isotopically stable deuterium labelled internal standards are used for the quantification of the carbonyl compounds. Results for the carbonyl compounds detected are then reported separately for the start, middle and end of the device.

<b>Approved By:</b>	Lynne Hessel	<b>Approved Date:</b>	20-September-2016
<b>User ID:</b>	LHessel		
<b>Title:</b>	Quality and Business Systems Manager		

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<b>Client Name:</b>	Nerudia	<b>Brand:</b>	Vaporesso Target Mini
<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

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## Method Title:           Emissions - The Determination Of Metals In Aerosol

### Overview

The heating elements (vapourisers) used in electronic cigarette devices can contain various metallic components which have the potential to release trace metals into the vapour at harmful levels. As devices can be manufactured from a range of different materials, the metals of concern should be assessed for each device. The method will therefore be suitable for screening and quantifying for a range of metal species of concern in such devices.

The method is designed to generate a known amount of aerosol from a specified e-liquid / e-cigarette combination, which is then captured in an acidified aqueous solution. The resulting liquid samples are then analysed using inductively coupled plasma - mass spectroscopy (ICP-MS), inductively coupled plasma - optical emission spectrometry (ICP-OES) and Mercury analysis.

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<b>Approved By:</b>	Lynne Hessel	<b>Approved Date:</b>	20-September-2016
<b>User ID:</b>	LHessel		
<b>Title:</b>	Quality and Business Systems Manager		

This sample has been approved by electronic signature functionality, which the approver uses as the legally-binding equivalent of a hand-written signature.

**Client Name:** Nerudia

**Description:** Target Mini (0.5ohm)+vPure12mg

**Nerudia Job Ref:** N/A

**Batch Number:** VSGV16660616

**Brand:** Vaporesso Target Mini

**SKU:** Kit  
N/A

**Strength:** 12mg/ml

**Bottle Size:** N/A (Device)

## Target Analytes

The following is a list of metals which may be found within the vapour produced by an e-cigarette when used under normal or reasonably foreseeable conditions.

Name	CAS N°	Method of detection
<b>Al (Aluminum)</b>	7429-90-5	ICP-MS
<b>Cr (Chromium)</b>	7440-47-3	ICP-MS
<b>Fe (Iron)</b>	7439-89-6	ICP-MS
<b>Ni (Nickel)</b>	7440-02-0	ICP-MS
<b>Sn (Tin)</b>	7440-31-5	ICP-MS
<b>Pb (Lead)</b>	7439-92-1	ICP-MS
<b>Hg (Mercury)</b>	7439-97-6	Hg Analyser
<b>Cd (Cadmium)</b>	7440-43-9	ICP-MS
<b>As (Arsenic)</b>	7440-38-2	ICP-MS
<b>Co (Cobalt)</b>	7440-48-4	ICP-MS
<b>V (Vanadium)</b>	7440-62-2	ICP-MS
<b>Sb (Antimony)</b>	7440-36-0	ICP-MS
<b>Mo (Molybdenum)</b>	7439-98-7	ICP-MS
<b>Cu (Copper)</b>	7440-50-8	ICP-MS
<b>Si (Silicon)</b>	7440-21-3	ICP-OES

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**User ID:** LHessel

**Title:** Quality and Business Systems Manager

**Approved Date:** 20-September-2016

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<b>Client Name:</b>	Nerudia	<b>Brand:</b>	Vaporesso Target Mini
<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

To date, there is no official guidance on appropriate toxicological safe levels of metals permitted in e-cigarette vapour. To establish appropriate limits of detection / quantification (LOD / LOQ) levels for the analytical methodology, the following table outlines an interpretation of information taken from a variety of international standards as described in the Methodology References listed later in this document. For the purposes of correlating exposure limits relative to daily e-cigarette usage, a maximum of 500 inhalations per day has been defined as 'normal or reasonably foreseeable conditions'. An 'alert limit' of 50% of the PDE (Permitted Daily Exposure) or PEL (Permitted Exposure Limit) has been established as a guide.

Name	Maximum PDE / PEL (µg / day)	Alert Limit 50% of PDE / PEL (µg / day 500 inhalations)	Reporting Threshold 50% of PDE / PEL (µg / 10 inhalations)
<b>Al (Aluminum)</b>	58000	29000	0.1
<b>Cr (Chromium)</b>	3	1.5	0.03
<b>Fe (Iron)</b>	130	65	13.0
<b>Ni (Nickel)</b>	5	2.5	0.05
<b>Sn (Tin)</b>	30	15	0.02
<b>Pb (Lead)</b>	5	2.5	0.05
<b>Hg (Mercury)</b>	1	0.5	0.01
<b>Cd (Cadmium)</b>	2	1	0.02
<b>As (Arsenic)</b>	2	1	0.02
<b>Co (Cobalt)</b>	3	1.5	0.03
<b>V (Vanadium)</b>	1	0.5	0.01
<b>Sb (Antimony)</b>	20	10	0.2
<b>Mo (Molybdenum)</b>	10	5	0.1
<b>Cu (Copper)</b>	30	15	0.3
<b>Si (Silicon)</b>	29000	14500	0.125

PDE = Permitted Daily Exposure

PEL = Permitted Exposure Limit

<b>Approved By:</b>	Lynne Hessel	<b>Approved Date:</b>	20-September-2016
<b>User ID:</b>	LHessel		
<b>Title:</b>	Quality and Business Systems Manager		

This sample has been approved by electronic signature functionality, which the approver uses as the legally-binding equivalent of a hand-written signature.

**Client Name:** Nerudia

**Description:** Target Mini (0.5ohm)+vPure12mg

**Nerudia Job Ref:** N/A

**Batch Number:** VSGV16660616

**Brand:** Vaporesso Target Mini

**SKU:** Kit  
N/A

**Strength:** 12mg/ml

**Bottle Size:** N/A (Device)

## Methodology References

Method Reference	Reference Title
<b>CORESTA RECOMMENDED METHOD N° 81</b>	Routine Analytical Machine For E-Cigarette Aerosol Generation And Collection – Definitions And Standard Conditions (June 2015)
<b>ISO 7210:2013</b>	Routine Analytical Cigarette-Smoking Machine – Additional Test Methods For Machine Verification
<b>ISO 3308:2012</b>	Routine Analytical Cigarette-Smoking Machine – Definitions And Standard Conditions
<b>ISO 558:1980</b>	Conditioning And Testing – Standard Atmospheres - Definitions
<b>ICH Q3D</b>	Guideline For Elemental Impurities
<b>CPMP/SWP/QWP/4446/00 corr</b>	Guideline On The Specification Limits For Residues Of Metal Catalysts (Draft)
<b>(EMEA/CHMP/SWP/4446/2000)</b>	Implementing The Guideline On The Specification Limits For Residues Of Metal Catalysts Or Metal Reagents
<b>United States Department of Labor, Occupational Safety and Health Administration</b>	Implementing The Guideline On The Specification Limits For Residues Of Metal Catalysts Or Metal Reagents

## Method Principles

The materials (e-cigarette devices or e-liquid) under test will be operated under controlled environmental conditions using an automated vaping machine. 100 inhalations from each sample will be generated at the start, middle and end of the device (a complete tank refill or cartridge). The aerosol generated for each set of 100 inhalations will be collected into an acidified aqueous solution. Aliquots of the collected samples will then be analysed by ICP-MS, ICP-OES and Mercury Analyser. Results for the metals detected are then reported separately for the start, middle and end of the device.

**Approved By:** Lynne Hessel

**User ID:** LHessel

**Title:** Quality and Business Systems Manager

**Approved Date:** 20-September-2016

This sample has been approved by electronic signature functionality, which the approver uses as the legally-binding equivalent of a hand-written signature.



<b>Client Name:</b>	Nerudia	<b>Brand:</b>	Vaporesso Target Mini
<b>Description:</b>	Target Mini (0.5ohm)+vPure12mg	<b>SKU:</b>	Kit N/A
<b>Nerudia Job Ref:</b>	N/A	<b>Strength:</b>	12mg/ml
<b>Batch Number:</b>	VSGV16660616	<b>Bottle Size:</b>	N/A (Device)

## Method Title: Nicotine Dose In Aerosol And Total Aerosol Mass

### Overview

During the vapourisation process, the e-liquid is heated to temperatures often exceeding 300°C. These temperatures are sufficiently high to convert the e-liquid into a vapour, allowing the nicotine in the solution to be inhaled by the consumer.

The determination of nicotine dose and uptake when consumed under normal or reasonably foreseeable conditions is best determined by chemical means; i.e. physical capture of the nicotine in the vapour and detection using an appropriately validated analytical method.

The method is designed to generate a known amount of aerosol under controlled sampling conditions from a specified e-liquid / e-cigarette combination, which is then physically captured on a glass fibre filter. The captured nicotine is then extracted into an acidified buffer solution and analysed using high performance liquid chromatography with ultra violet detection (HPLC-UV).

Total aerosol mass produced by the e-liquid / e-cigarette combination is determined to provide supplementary information to the method (e.g. to correlate the amount of nicotine or other emission present in relation to the amount of e-liquid used).

### Target Analytes

Name	CAS N°	Method LOQ
Nicotine	54-11-5	0.1 µg / 10 inhalations

<b>Approved By:</b>	Lynne Hessel	<b>Approved Date:</b>	20-September-2016
<b>User ID:</b>	LHessel		
<b>Title:</b>	Quality and Business Systems Manager		

This sample has been approved by electronic signature functionality, which the approver uses as the legally-binding equivalent of a hand-written signature.

**Client Name:** Nerudia

**Description:** Target Mini (0.5ohm)+vPure12mg

**Nerudia Job Ref:** N/A

**Batch Number:** VSGV16660616

**Brand:** Vaporesso Target Mini

**SKU:** Kit  
N/A

**Strength:** 12mg/ml

**Bottle Size:** N/A (Device)

## Methodology References

Method Reference	Reference Title
<b>CORESTA RECOMMENDED METHOD N° 81</b>	Routine Analytical Machine For E-Cigarette Aerosol Generation And Collection – Definitions And Standard Conditions (June 2015)
<b>ISO 7210:2013</b>	Routine Analytical Cigarette-Smoking Machine – Additional Test Methods For Machine Verification
<b>ISO 3308:2012</b>	Routine Analytical Cigarette-Smoking Machine – Definitions And Standard Conditions
<b>ISO 558:1980</b>	Conditioning And Testing – Standard Atmospheres - Definitions
<b>CORESTA Task Force Technical Report</b>	2014 Electronic Cigarette Aerosol Parameters Study
<b>British Pharmacopoeia Monograph</b>	Nicotine Inhalation Cartridges

## Method Principles

The materials (e-cigarette devices or e-liquid) under test will be operated under controlled environmental conditions using an automated vaping machine. Ten inhalations from each sample will be generated at the start, middle and end of the device (a complete tank refill or cartridge). The aerosol generated for each set of ten inhalations will be captured onto a glass fibre filter pad. The filter pad is then dissolved in an acidic aqueous buffer solution to extract the nicotine for analysis. The solution is filtered to remove particulates and is then analysed by HPLC-UV. The nicotine is quantified using external linear standards. Results for the nicotine dose are then reported separately for the start, middle and end of the device.

Total aerosol mass is calculated by mass difference. The glass fibre filter pads are accurately weighed before and after each set of ten inhalations. Results for the aerosol mass are then reported per ten inhalations.

**Approved By:** Lynne Hessel

**User ID:** LHessel

**Title:** Quality and Business Systems Manager

**Approved Date:** 20-September-2016

This sample has been approved by electronic signature functionality, which the approver uses as the legally-binding equivalent of a hand-written signature.