CERTIFICATE OF ANALYSIS

CLIENT DETAILS: BLVK
DATE STARTED: 13-Feb-2023
CERTIFICATE NUMBER: CA22758
STUDY REFERENCE: PN22096

SAMPLE DETAILS

SAMPLE DESCRIPTION: Spearmint e-liquid 20mg 3x10ml
USN: D539

RESULTS (AEROSOL)

Aerosol mass

ANALYTE	TEST METHOD	UNIT	RESULT	STANDARD DEVIATION
E-liquid vaporised mass (EVM) [N]	TM 11.16.1	mg/10 inhalations	34.9	1.311

Aldehydes and ketones

ANALYTE	TEST METHOD	UNIT	RESULT	STANDARD DEVIATION
Formaldehyde [A]	TM 11.11.3	ug/10 inhalations	nd	-
Acetaldehyde [A]	TM 11.11.3	ug/10 inhalations	nd	-
Acrolein [A]	TM 11.11.3	ug/10 inhalations	nd	-
Crotonaldehyde [A]	TM 11.11.3	ug/10 inhalations	nd	-

Nicotine

ANALYTE	TEST METHOD	UNIT	RESULT	STANDARD DEVIATION
Nicotine [A]	TM 11.12.1	mg/g	22.87	8.753
	TM 11.12.1	mg/10 inhalations	0.80	-

Major Components

ANALYTE	TEST METHOD	UNIT	RESULT
Propylene glycol [A]	TM 11.12.1	mg/g	265.0
Glycerin [A]	TM 11.12.1	mg/g	475.8
Propionic acid [A]	TM 11.12.1	mg/g	nd
Ethylene glycol [A]	TM 11.12.1	mg/g	nd
Diethylene glycol [A]	TM 11.12.1	mg/g	nd
Menthol [A]	TM 11.12.1	mg/g	1.3

VOCs and flavour compounds

Analyte	TEST METHOD	UNIT	RESULT	STANDARD DEVIATION
Methyl acetate [A]	TM 11.15.1	ug/50 inhalations	nd	-
Acrylonitrile [A]	TM 11.15.1	ug/50 inhalations	nd	-
Diacetyl [A]	TM 11.15.1	ug/50 inhalations	nd	-
Ethyl acetate [A]	TM 11.15.1	ug/50 inhalations	nd	-
Benzene [A]	TM 11.15.1	ug/50 inhalations	nd	-
n-butanol [N]	TM 11.15.1	ug/50 inhalations	nd	-
Toluene [A]	TM 11.15.1	ug/50 inhalations	nd	-
Iso butyl acetate [A]	TM 11.15.1	ug/50 inhalations	nd	-
Acetyl propionyl [A]	TM 11.15.1	ug/50 inhalations	nd	-
Furfural [A]	TM 11.15.1	ug/50 inhalations	nd	-
Iso pentyl acetate [A]	TM 11.15.1	ug/50 inhalations	2.0	0.558
Benzyl acetate [A]	TM 11.15.1	ug/50 inhalations	nd	-

RESULTS (LIQUID)

ANALYTE	TEST METHOD	UNIT	RESULT
Density [A]	OP 11.67.1	g/ml	1.1684

[A] Accredited to ISO 17025

[N] Not accredited to ISO 17025

nd Not detected

REPORTING LIMITS

ANALYTE	UNIT	LIMIT OF DETECTION
Propionic acid	mg/10 inhalations	0.14
Ethylene glycol	mg/10 inhalations	0.16
Propylene glycol	mg/10 inhalations	0.44
Glycerol	mg/10 inhalations	0.36
Diethylene glycol	mg/10 inhalations	0.14
Menthol	mg/10 inhalations	0.28
Nicotine	mg/10 inhalations	0.28
Formaldehyde	ug/10 inhalations	0.454
Acetaldehyde	ug/10 inhalations	0.932
Acrolein	ug/10 inhalations	1.09
Crotonaldehyde	ug/10 inhalations	2.12
Butyraldehyde	ug/10 inhalations	2.33
Benzaldehyde	ug/10 inhalations	1.53
Methyl acetate	ug/50 inhalations	4.4
Acrylonitrile	ug/50 inhalations	3.1
Diacetyl	ug/50 inhalations	4.0
Ethyl acetate	ug/50 inhalations	4.2
Benzene	ug/50 inhalations	2.6
n-butanol	ug/50 inhalations	4.4
Toluene	ug/50 inhalations	2.7
Iso butyl acetate	ug/50 inhalations	0.6
Acetyl propionyl	ug/50 inhalations	2.2
Furfural	ug/50 inhalations	4.1
Iso pentyl acetate	ug/50 inhalations	0.9
Benzyl acetate	ug/50 inhalations	1.5

ADDITIONAL INFORMATION

Puffing carried out using the standard puffing regime

- 55ml volume
- 3 second duration
- 30 second inter-inhalation duration

Aerosol generation carried out using Cerulean CETI8 and MV Sabre ENDs system

TM 11.11.3

Sample aerosol was vaped through an impinger solution of 2,4 DNPH (dinitrophenylhydrazine) where analytes were derivatised. Analysis of standards and samples was carried out using high performance liquid chromatography with UV detection (HPLC-UV Agilent 1260 Infinity II) and the Thermo Scientific Acclaim Carbonyl C18 column 5um x 4.6 x 250mm.

TM 11.15.1

Sample aerosol was captured using ORBO charcoal tubes. Analytes were desorbed using carbon disulphide and methanol. Analysis of standards and samples was then carried out using gas chromatography with mass spectrometry (GC/MS Agilent 7890B/5977B) and a DB-624 column 60m x 0.250mm x 1.40um.

TM 11.12.1

Sample aerosol was captured on Cambridge Filter Pads before being extracted using propan-2-ol. Standards and samples were analysed using gas chromatography with flame ionisation detection (GC-FID Agilent 7890B) and a DB-ALC1 column 30m x 0.320mm x 1.80um.

CONDITIONS OF CERTIFICATE

This Certificate of Analysis relates only to the samples supplied to the laboratory. All samples have been provided by the Client. The results in this certificate should only be reproduced in full. All testing is carried out at the laboratory's permanent facilities.

CERTIFICATE APPROVAL

Laboratory Manager

Craig Sergeson (Mar 6, 2023 16:36 GMT)

Craig Sergeson

Quality Manager

David Lawson (Mar 6, 2023 16:40 GMT)

David Lawson

Date: 06-Mar-2023

CHEMICAL CAS BREAKDOWN

Chemical Name	CAS Number	Concentration (%)	Volume (mg/ml)
Propylene Glycol	57-55-6	14.76	242
Glycerol	56-81-5	77.51282	191.541
Nicotine	54-11-5	0.16318	8.159
Carvone	6485-40-1	0.85	5
Peppermint Oil	84082-70-2	0.85	5
N-ethyl-2-isopropyl-5-methylcyclohexanecarboxamide	39711-79-0	0.4	10
Menthol	89-78-1	1	50
3-Hydroxy-2-methyl-4-pyrone	118-71-8	0.392	4.9
Water	7732-18-5	3.68	46
Sucralose	56038-13-2	0.392	4.9

BLVK CA22758 Spearmint e-liquid 20mg 3x10ml D539

Final Audit Report 2023-03-06

Created:	2023-03-06
By:	tim Liddicoat (tim.liddicoat@inter-scientific.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAAB_x8LpVqe49cYW7ERmdDcBh1kMjE7hWv

"BLVK CA22758 Spearmint e-liquid 20mg 3x10ml D539" History

Document created by tim Liddicoat (tim.liddicoat@inter-scientific.com)
2023-03-06 - 4:14:15 PM GMT

Document emailed to craig.sergeson@inter-scientific.com for signature
2023-03-06 - 4:14:55 PM GMT

Email viewed by craig.sergeson@inter-scientific.com
2023-03-06 - 4:35:29 PM GMT

Signer craig.sergeson@inter-scientific.com entered name at signing as Craig Sergeson
2023-03-06 - 4:36:01 PM GMT

Document e-signed by Craig Sergeson (craig.sergeson@inter-scientific.com)
Signature Date: 2023-03-06 - 4:36:03 PM GMT - Time Source: server

Document emailed to David Lawson (david.lawson@inter-scientific.com) for signature
2023-03-06 - 4:36:04 PM GMT

Email viewed by David Lawson (david.lawson@inter-scientific.com)
2023-03-06 - 4:37:37 PM GMT

Document e-signed by David Lawson (david.lawson@inter-scientific.com)
Signature Date: 2023-03-06 - 4:40:15 PM GMT - Time Source: server

Agreement completed.
2023-03-06 - 4:40:15 PM GMT