



## Test Report

### Nixamide E-liquid Analysis

For the Attention of: Ready Mix

<b>Study Reference</b>	<b>HAL23-043</b>
<b>Test Report Number</b>	<b>HAL23-043-0-1</b>
<b>Study Description</b>	<b>e-liquid HPHC analysis</b>
<b>Submitting Customer</b>	<b>Ready Mix</b>
<b>Customer Reference</b>	<b>Ready Mix Naturals</b>
<b>Date of Test Report</b>	<b>04-Sep-2023</b>

**Authorised on behalf of Element Materials Technology Analytical Services Ltd**

 4<sup>th</sup>-Sept-2023

**Laboratory Manager**

**Note:**

- The results relate only to the items tested.
- Tests not covered under the scope of Element Manchester's ISO 17025 accreditation are identified with an asterisk (\*).
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<b>Element Sample ID</b>	<b>Customer Sample ID</b>	<b>Date Received</b>
H85138	Nixamide / Vegetable Glycerine For Lab Testing / No Flavour - 100mg	24-Apr-2023
H85158	VG/Nixamide 6mg Solution without flavouring 30ml	24-Apr-2023

## Glossary

Term	Definition
ACM	Aerosol Collected Mass
SD	Standard Deviation
%RSD	Relative Standard Deviation expressed as a percentage
LLD	Low-Liquid Detection
PG	Propylene Glycol
VG	Vegetable Glycerin
EG	Ethylene glycol
DEG	Diethylene glycol
LoQ/LLoQ	(Lower) Limit of Quantification as determined during method validation.
U	Uncertainty of measurement – expanded uncertainty with k=2 unless otherwise stated.
s	Seconds
mL	Millilitres
g	Grams
LC-MS	Liquid Chromatography-Mass Spectrometry
GC-MS	Gas Chromatography-Mass Spectrometry
GC-FID	Gas Chromatography-Flame Ionisation Detection
ICP-MS	Inductively Coupled Plasma-Mass Spectrometry

## Aerosol Generation Conditions

Aerosol samples were generated using a regime described in Table 1 and based upon those described in CRM 81 / ISO 20768.

Table 1

Instrument	Cerulean SM450e
Puff Volume	55 mL
Puff Duration	3 s
Puff Interval	30 s
Puff Block	Testing suite dependant
Vaping Angle	-45°
Puff Profile	Square Wave

CFPs and holders were weighed pre and post each puff block to enable ACM to be calculated.

Study Reference: HAL23-043

**Test Method: TM\_SOP\_045\* (e-liquid)**

Major Components (Nicotine, Propylene Glycol, Glycerin and Menthol) in E-liquids and ENDS Emissions by GC-FID

Storage conditions: Ambient

The results of 3 replicates are described in Table 2.

**Table 2**

Element Sample ID	Test	Start Date	End Date	Nicotine	Mean	%RSD	PG	Mean	%RSD	VG	Mean	%RSD	Units
H85138	1	13-Jul-2023	17-Jul-2023	<0.08	n/a	n/a	<2	n/a	n/a	993	988	1.3%	mg/g
	2			<0.08			<2			973			mg/g
	3			<0.08			<2			998			mg/g
H85158	1	13-Jul-2023	17-Jul-2023	<0.08	n/a	n/a	<2	n/a	n/a	993	n/a	n/a	mg/g
	2			<0.08			<2			>1,000*			mg/g
	3			<0.08			<2			>1,000*			mg/g

\*Greater than upper LOQ of method TM\_SOP\_045 for VG

Study Reference: HAL23-043

**Test Method: TM\_SOP\_045\* (Aerosol Emissions)**

Major Components (Nicotine, Propylene Glycol, Glycerin and Menthol) in E-liquids and ENDS Emissions by GC-FID

Storage conditions: Ambient

The results of 3 replicates are described in Table 3 - Table 4. Aerosol generated using Innokin Zlide Tank (0.48 Ohm Mesh Coil) and Evolv™ battery unit (power set at 12W)

**Table 3:**

Element Sample ID	Test	Start Date	End Date	Nicotine	Mean	%RSD	PG	Mean	%RSD	Units
H85138	1	21-Jul-2023	21-Jul-2023	<1.0	n/a	n/a	<25	n/a	n/a	µg/puff
	2			<1.0			<25			µg/puff
	3			<1.0			<25			µg/puff
H85158	1	21-Jul-2023	21-Jul-2023	<1.0	n/a	n/a	<25	n/a	n/a	µg/puff
	2			<1.0			<25			µg/puff
	3			<1.0			<25			µg/puff

**Table 4:**

Element Sample ID	Test	Start Date	End Date	VG	Mean	%RSD	Units	ACM	Mean	%RSD	Units
H85138	1	21-Jul-2023	21-Jul-2023	3199	3553	10.0%	µg/puff	0.0691	0.0737	7.11%	g
	2			3912			µg/puff	0.0810			g
	3			3547			µg/puff	0.0709			g
H85158	1	21-Jul-2023	21-Jul-2023	4337	4717	11.1%	µg/puff	0.0846	0.0897	5.52%	g
	2			5312			µg/puff	0.0964			g
	3			4502			µg/puff	0.0881			g

Study Reference: HAL23-043

**Test Method: TM\_SOP\_005 (Aerosol Emissions)**

Mono-carbonyl analysis: Formaldehyde, acetaldehyde, butyraldehyde in e-liquids / aerosol emissions by LC-MS. Aerosol generated as described in Table 1. Aerosol generated using Innokin Zlide Tank (0.48 Ohm Mesh Coil) and Geekvape NOVA TC battery unit (power set at 12W)

Storage conditions: Ambient

The results of 3 replicates are described in Table 5 - Table 6

Note: Method deviation – d2-formaldehyde IS for calculated response of acetaldehyde (Risk Assessment (RA-034))

**Table 5:**

Element Sample ID	Test	Start Date	End Date	Formaldehyde	Mean	%RSD	Acetaldehyde	Mean	%RSD	Units
H85138	1	13-Jul-2023	14-Jul-2023	2.345	1.985	0.2	0.040	0.038	0.2	µg/puff
	2			1.460			0.030			µg/puff
	3			2.149			0.044			µg/puff
H85158	1	13-Jul-2023	14-Jul-2023	0.311	0.250	0.3	0.011	n/a	n/a	µg/puff
	2			0.152			<0.005			µg/puff
	3			0.286			0.006			µg/puff
U	-	-	-	23	-	-	27	-	-	%

**Table 6:**

Element Sample ID	Test	Start Date	End Date	Butyraldehyde	Mean	%RSD	ACM	Mean	%RSD	Units
H85138	1	13-Jul-2023	14-Jul-2023	<0.005	n/a	n/a	0.2326	0.215	0.1	g
	2			<0.005			0.1998			g
	3			<0.005			0.2138			g
H85158	1	13-Jul-2023	14-Jul-2023	<0.005	n/a	n/a	0.2526	0.353	0.4	g
	2			<0.005			0.5393			g
	3			<0.005			0.2675			g
U	-	-	-	10	-	-	-	-	-	%

**Test Method: TM\_SOP\_050\* & TM\_SOP\_001 (Aerosol Emissions)**

Flavours and VOCs in e-liquids / aerosol emissions by GC-MS. Aerosol generated as described in Table 1.

Storage conditions: Ambient

The results of 3 replicates are described in Table 7 - Table 9. Aerosol generated using Innokin Zlide Tank (0.48 Ohm Mesh Coil) and Geekvape NOVA TC battery unit (power set at 12W).

**Table 7:**

Element Sample ID	Test	Start Date	End Date	2-3 Pentane-dione	Mean	%RSD	Acrylonitrile	Mean	%RSD	Benzene	Mean	%RSD	1-butanol	Mean	%RSD	Units
H85138	1	01-Aug-2023	01-Aug-2023	<0.10*	n/a	n/a	<0.10*	n/a	n/a	<0.10*	n/a	n/a	<0.10*	n/a	n/a	µg/puff
	2			<0.10*			<0.10*			<0.10*			µg/puff			
	3			<0.10*			<0.10*			<0.10*			µg/puff			
H85158	1	01-Aug-2023	01-Aug-2023	<0.10*	n/a	n/a	<0.10*	n/a	n/a	<0.10*	n/a	n/a	<0.10*	n/a	n/a	µg/puff
	2			<0.10*			<0.10*			<0.10*			µg/puff			
	3			<0.10*			<0.10*			<0.10*			µg/puff			

**Table 8:**

Element Sample ID	Test	Start Date	End Date	Diacetyl	Mean	%RSD	Isoamyl acetate	Mean	%RSD	Isobutyl acetate	Mean	%RSD	Methyl Acetate	Mean	%RSD	Units
H85138	1	01-Aug-2023	01-Aug-2023	<0.10*	n/a	n/a	<0.10*	n/a	n/a	<0.10*	n/a	n/a	<0.10*	n/a	n/a	µg/puff
	2			<0.10*			<0.10*			<0.10*			µg/puff			
	3			<0.10*			<0.10*			<0.10*			µg/puff			
H85158	1	01-Aug-2023	01-Aug-2023	<0.10*	n/a	n/a	<0.10*	n/a	n/a	<0.10*	n/a	n/a	<0.10*	n/a	n/a	µg/puff
	2			<0.10*			<0.10*			<0.10*			µg/puff			
	3			<0.10*			<0.10*			<0.10*			µg/puff			

**Table 9:**

Element Sample ID	Test	Start Date	End Date	Methyl acetate	Mean	%RSD	Toluene	Mean	%RSD	Units	ACM	Mean	%RSD	Units
H85138	1	01-Aug-2023	01-Aug-2023	<0.10*	n/a	n/a	<0.10*	n/a	n/a	µg/puff	0.2161*	n/a	n/a	g
	2			<0.10*			<0.10*			µg/puff	0.2162*			g
	3			<0.10*			<0.10*			µg/puff	0.2423*			g
H85158	1	01-Aug-2023	01-Aug-2023	<0.10*	n/a	n/a	<0.10*	n/a	n/a	µg/puff	0.2337*	n/a	n/a	g
	2			<0.10*			<0.10*			µg/puff	0.2351*			g
	3			<0.10*			<0.10*			µg/puff	0.1881*			g

Study Reference: HAL23-043

**Test Method: TM\_SOP\_050\* & TM\_SOP\_002 (Aerosol Emissions)**

Flavours and VOCs in e-liquids / aerosol emissions by GC-MS. Aerosol generated as described in Table 1.

Storage conditions: Ambient

The results of 3 replicates are described in Table 10 - Table 11. Aerosol generated using Innokin Zlide Tank (0.48 Ohm Mesh Coil) and Geekvape NOVA TC battery unit (power set at 12W).

**Table 10:**

Element Sample ID	Test	Start Date	End Date	Acrolein	Mean	%RSD	Croton-Aldehyde	Mean	%RSD	Units	ACM	Mean	%RSD	Units
H85138	Rep 1	12-Jul-2023	12-Jul-2023	<0.10*	n/a	n/a	<0.50*	n/a	n/a	µg/puff	0.2648*	n/a	n/a	g
	Rep 2			<0.10*			<0.50*			µg/puff	0.1987*			g
	Rep 3			<0.10*			<0.50*			µg/puff	0.2239*			g
H85158	Rep 1	12-Jul-2023	12-Jul-2023	<0.10*	n/a	n/a	<0.50*	n/a	n/a	µg/puff	0.2121*	n/a	n/a	g
	Rep 2			<0.10*			<0.50*			µg/puff	0.2634*			g
	Rep 3			<0.10*			<0.50*			µg/puff	0.2798*			g

**Table 11:**

Element Sample ID	Test	Start Date	End Date	Furfural	Mean	%RSD	Propylene Oxide	Mean	%RSD	Units
H85138	Rep 1	12-Jul-2023	12-Jul-2023	0.76*	0.69*	13.61*	<0.50*	n/a	n/a	µg/puff
	Rep 2			0.58*			<0.50*			µg/puff
	Rep 3			0.71*			<0.50*			µg/puff
H85158	Rep 1	12-Jul-2023	12-Jul-2023	<0.50*	n/a	n/a	<0.50*	n/a	n/a	µg/puff
	Rep 2			<0.50*			<0.50*			µg/puff
	Rep 3			<0.50*			<0.50*			µg/puff

**End of Test Report**