Black Note, Inc.

2967 Michelson Dr. Suite G153
Irvine, CA 92612

eLiquid Analysis

Samples Received 11/07/2014

Analysis Report

(1114-79 R6)

GC/FID Analysis (ENT184)

Diethylene glycol (DEG), Ethylene glycol
Propylene glycol, Vegetable Glycerin

HPLC/UV Analysis (ENT301)

Acetoin, Acetone, Acrolein, Diacetyl, 2,3-Pentanedione

GC/MS Analysis (ENT225)

Diacetyl, 2,3-Pentanedione, Acetoin

Enthalpy Analytical, Inc.

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I certify that to the best of my knowledge all analytical data presented in this report:

- Have been checked for completeness
- Are accurate, error-free, and legible
- Have been conducted in accordance with approved protocol, and that all deviations and analytical problems are summarized in the appropriate narrative(s)

This analytical report was prepared in Portable Document Format (.PDF) and contains 13 pages.

Electronically signed by: Jennifer Feller (EAINC\jfeller)
Date: Thursday, September 08, 2016 12:11:54 PM (GMT -04:00)
Location: EA DUR
Reason: Document has been reviewed and approved

Report Issued: 9/8/2016

Summary of Results

Report for: Black Note, Inc.
Client Project: na
Sample Type: eliquid

Project Code: 1114-79
Project Start Date: 11/7/14
Analysis Methods: ENT184

Enthalpy Code	Sample ID	Notes	Diethylene glycol (ug/mL)
1114-79-01	BLACK NOTE: PRELUDE		ND
1114-79-02	BLACK NOTE: ADAGIO		ND
1114-79-03	BLACK NOTE: SONATA		ND
1114-79-04	BLACK NOTE: SOLO		ND
1114-79-05	BLACK NOTE: CADENZA		ND
1114-79-06	BLACK NOTE: BRAVURA		ND
1114-79-07	BLACK NOTE: FORTE		ND
1114-79-08	BLACK NOTE: LEGATO		ND

ND: Not Detected above 17.8 ug/mL.

Report for: Black Note, Inc.
Client Project: na
Sample Type: eliquid

Project Code: 1114-79
Project Start Date: 11/7/14
Analysis Methods: ENT184

Enthalpy Code	Sample ID	Notes	Ethylene Glycol (ug/mL)
1114-79-01	BLACK NOTE: PRELUDE		ND
1114-79-02	BLACK NOTE: ADAGIO		ND
1114-79-03	BLACK NOTE: SONATA		ND
1114-79-04	BLACK NOTE: SOLO		ND
1114-79-05	BLACK NOTE: CADENZA		ND
1114-79-06	BLACK NOTE: BRAVURA		ND
1114-79-07	BLACK NOTE: FORTE		ND
1114-79-08	BLACK NOTE: LEGATO		ND

ND: Not Detected above 27.5 ug/mL.

Report for: Black Note, Inc.

Client Project: na

Sample Type: eC liquid

Project Code: 1114-79

Project Start Date: 11/7/14

Analysis Method: ENT184

Enthalpy Code	Client Code	Propylene glycol (mg/mL)	Glycerin (mg/mL)
1114-79-01	BLACK NOTE: PRELUDE	521	482
1114-79-02	BLACK NOTE: ADAGIO	526	447
1114-79-03	BLACK NOTE: SONATA	515	449
1114-79-04	BLACK NOTE: SOLO	510	465
1114-79-05	BLACK NOTE: CADENZA	522	487
1114-79-06	BLACK NOTE: BRAVURA	513	445
1114-79-07	BLACK NOTE: FORTE	531	452
1114-79-08	BLACK NOTE: LEGATO	533	480

Report for: Black Note, Inc.
Client Project: na
Sample Type: eliquid

Project Code: 1114-79
Project Start Date: 11/7/14
Analysis Method: ENT301

Blank Corrected Concentrations, ug/mL

Enthalpy Code	Client Code	Acetoin # (ug/mL)	Acetone (ug/mL)	Acrolein (ug/mL)	Diacetyl (ug/mL)	2,3-Pentanedione # (ug/mL)
1114-79-01	BLACK NOTE: PRELUDE	ND	ND	ND	ND	ND
1114-79-02	BLACK NOTE: ADAGIO	ND	ND	ND	ND	ND
1114-79-03	BLACK NOTE: SONATA	ND	ND	ND	ND	ND
1114-79-04	BLACK NOTE: SOLO	ND	ND	ND	ND	ND
1114-79-05	BLACK NOTE: CADENZA	ND	ND	ND	ND	ND
1114-79-06	BLACK NOTE: BRAVURA	ND	ND	ND	ND	ND
1114-79-07	BLACK NOTE: FORTE	ND	ND	ND	ND	ND
1114-79-08	BLACK NOTE: LEGATO	ND	ND	ND	ND	ND

Acetoin is also known as 3-Hydroxy-2-butanone and 2,3-pentanedione is also known as acetyl propionyl.

ND Not Detected above: 0.286 ug/mL for acetone, and acrolein; 0.294 ug/mL for acetoin; 0.279 ug/mL for diacetyl; 0.281 ug/mL for 2,3-pentanedione.

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Testing Cert. # 3198.01

Report for: Black Note
Client Project: na
Sample Type: e-Liquid

Project Code: 0716-538
Project Start Date: 7/25/16
Analysis Method: ENT225

Lowest Standard Value (LOQ), ug/mL	11.3	10.7	19.5
Minimum Detection Limit (MDL), ug/mL	1.13	1.07	1.87

			Concentrations, ug/mL		
Enthalpy Code	**Client Sample ID**	**Notes**	**Diacetyl**	**2,3-Pentanedione #**	**Acetoin #**
0716-538-07-1	BLACK NOTE: QUARTET	--	ND	ND	ND

#: Acetoin is also known as 3-hydroxy-2-butanone and 2,3-Pentanedione is also known as acetyl propionyl.

ND: Non Detect or analytical result is below the MDL and is less than (<) the reported value.

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	Black Note, Inc.
Analysts	KEH, WJG, CIS
Parameters	ENT184, ENT301, ENT225

Client Proj	na
Job #	1114-79 R6
# Samples	9 eLiquid samples

Custody

Summer Mims received the samples for Enthalpy project 1114-79 on 11/7/14 after being relinquished by Black Note, Inc. Tiffany Stein received the samples for Enthalpy project 0716-538A on 7/25/16 after being relinquished by Black Note, Inc. The samples were received at ambient temperature in good condition. Prior to, during, and after analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, Inc.

Analysis (DEG/EG)

The samples for 1114-79 were prepared and analyzed for diethylene glycol (DEG) following the analytical procedures in Enthalpy SOP ENT 184.

These samples were also analyzed by GC/FID for the presence of ethylene glycol (EG). To accomplish this, a known amount of ethylene glycol was injected to verify the method detection limit and compound retention time. A standard solution of 27.5 µg/mL was found to give an acceptable response and the method detection limit was set to this amount. None of the samples had a detectable peak at the retention time for ethylene glycol; therefore, all samples are reported as "ND" (not detected above 27.5 µg/mL).

The Hewlett Packard Model 6890N, Gas Chromatograph "BMO" was equipped with a FID and the appropriate column.

Analysis (PG/VG)

The samples for 1114-79 were prepared and analyzed for propylene glycol (PG) and vegetable glycerin (VG or glycerin) following the analytical procedures in Enthalpy SOP ENT 184.

The Hewlett Packard Model 5890, Series II Gas Chromatograph ("Ricky" S/N 3336A52180) was equipped with a Flame Ionization Detector and an appropriate column.

Enthalpy Analytical Narrative Summary
(continued)

Analysis (Carbonyls)	The samples for 1114-79 were analyzed for acetoin, acetone, acrolein, diacetyl, and 2,3-pentanedione following the procedures in Enthalpy SOP ENT301. The samples were analyzed using the Agilent Model 1100, High Performance Liquid Chromatograph "Groucho" equipped with an Ultraviolet (UV) Detector operating at 365 nm and an appropriate column.
Carbonyls (ENT225)	Sample 0716-538-07 (***QUARTET***) was analyzed for diacetyl, 2,3-pentanedione (aka acetyl propionyl), and acetoin (aka 3-hydroxy-2-butanone) following the analytical procedures in Enthalpy SOP ENT225. A measured volume of sample was combined with a measured volume of acetonitrile. A measured amount of internal standard (butanedione-d6) was added and the vial capped and mixed thoroughly to combine. An aliquot was then analyzed quantitatively against a linear calibration curve using a GC/MS. The Agilent Technologies Model 6890N Gas Chromatograph “Herman” was equipped with a 5975B Mass Selective Detector and an appropriate column for these analyses.
QC Notes	DEG was not detected above the minimum detection limit (MDL) in the laboratory blank. PG and VG were not detected above the minimum detection limit (MDL) in the laboratory blank. Acetoin, acrolein, diacetyl, and 2,3-pentanedione were not detected above the minimum detection limit (MDL) in the laboratory blanks. Acetone was detected in the laboratory blanks and the reported results have been blank-corrected.
Reporting Notes	This report 1114-79R6 replaces report 1114-79R5 issued on 3/5/15. Sample and calibration curve chromatograms are available upon request. The results presented in this report are representative of the samples as provided to the laboratory.

General Reporting Notes

The following are general reporting notes that are applicable to all Enthalpy Analytical, Inc. data reports, unless specifically noted otherwise.

- Any analysis which refers to the method as ***"Type"*** represents a planned deviation from the reference method. For instance a Hydrogen Sulfide assay from a Tedlar bag would be labeled as "EPA Method 16-Type" because Tedlar bags are not mentioned as one of the collection options in EPA Method 16.
- The acronym ***MDL*** represents the Minimum Detection Limit. Below this value the laboratory cannot determine the presence of the analyte of interest reliably.
- The acronym ***LOQ*** represents the Limit of Quantification. Below this value the laboratory cannot quantitate the analyte of interest within the criteria of the method.
- The acronym ***ND*** following a value indicates a non-detect or analytical result below the MDL.
- The letter ***J*** in the Qualifier or Flag column in the results indicates that the value is between the MDL and the LOQ. The laboratory can positively identify the analyte of interest as present, but the value should be considered an estimate.
- The letter ***E*** in the Qualifier or Flag column indicates an analytical result exceeding 100% of the highest calibration point. The associated value should be considered as an estimate.
- The acronym ***DF*** represents Dilution Factor. This number represents dilution of the sample during the preparation and/or analysis process. The analytical result taken from a laboratory instrument is multiplied by the DF to determine the final undiluted sample results.
- The addition of ***MS*** to the Sample ID represents a Matrix Spike. An aliquot of an actual sample is spiked with a known amount of analyte so that a percent recovery value can be determined. The MS analysis indicates what effect the sample matrix may have on the target analyte, i.e. whether or not anything in the sample matrix interferes with the analysis of the analyte(s).
- The addition of ***MSD*** to the Sample ID represents a Matrix Spike Duplicate. Prepared in the same manner as a MS, the use of duplicate matrix spikes allows further confirmation of laboratory quality by showing the consistency of results gained by performing the same steps multiple times.
- The addition of ***LD*** to the Sample ID represents a Laboratory Duplicate. The analyst prepares an additional aliquot of sample for testing and the results of the duplicate analysis are compared to the initial result. The result should have a difference value of within 10% of the initial result (if the results of the original analysis are greater than the LOQ).
- The addition of ***AD*** to the Sample ID represents an Alternate Dilution. The analyst prepares an additional aliquot at a different dilution factor (usually double the initial factor). This analysis helps confirm that no additional compound is present and coeluting or sharing absorbance with the analyte of interest, as they would have a different response/absorbance than the analyte of interest.

General Reporting Notes

(continued)

- The Sample ID ***LCS*** represents a Laboratory Control Sample. Clean matrix, similar to the client sample matrix, prepared and analyzed by the laboratory using the same reagents, spiking standards and procedures used for the client samples. The LCS is used to assess the control of the laboratory's analytical system. Whenever spikes are prepared for our client projects, two spikes are retained as LCSs. The LCSs are labeled with the associated project number and kept in-house at the appropriate temperature conditions. When the project samples are received for analysis, the LCSs are analyzed to confirm that the analyte could be recovered from the media, separate from the samples which were used on the project and which may have been affected by source matrix, sample collection and/or sample transport.
- **Significant Figures**: Where the reported value is much greater than unity (1.00) in the units expressed, the number is rounded to a whole number of units, rather than to 3 significant figures. For example, a value of 10,456.45 ug catch is rounded to 10,456 ug. There are five significant digits displayed, but no confidence should be placed on more than two significant digits.
- **Manual Integration**: The data system used for processing will flag manually integrated peaks with an "M". There are several reasons a peak may be manually integrated. These reasons will be identified by the following two letter designations on sample chromatograms, if provided in the report. The peak was ***not integrated*** by the software **"NI"**, the peak was ***integrated incorrectly*** by the software **"II"** or the ***wrong peak*** was integrated by the software **"WP"**. These codes will accompany the analyst's manual integration stamp placed next to the compound name on the chromatogram.