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 Date: December 23, 2015  
 P.O.: N.A.

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 Quote No: Qu-00654488-1  
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### Intertek Environmental VOC Emissions

Test Summary	
Test Method	ASTM D7706-11 (March 2011)
Modeling Scenario	Commercial Salon

Customer Information	
Customer	Elizabeth Fatima Do Nascimento Aime
Address	7200 Lake Ellenor Dr., Suite 144 Orlando, FL 32809
Contact Name	Luis Lopes
Phone Number	(407) 601-3863
Email	<a href="mailto:luis@bionatcosmetics.com">luis@bionatcosmetics.com</a>

Product Sample Information	
Manufacturer / Location	Bionat Cosméticos – São Paulo-Brazil
Product Name	Alizzé Orthomolecular Nano System Demineralizing Shampoo 1
Product Category	Demineralizing Shampoo
Commercial Part Number	64
Date of Manufacture	10/16/2015
Date of Collection	11/09/2015
Date of Shipment	11/11/2015
Date Received by Lab	11/13/2015
As Received Sample Condition	Good Condition
Lab Sample ID	GRR1511131050-001

Taylor Gebben  
 Project Engineer

Jesse Ondersma, Ph.D.  
 Reviewer / Senior Chemist

Report Certification Date: December 30, 2015

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**DESCRIPTION OF SAMPLES:**

Part Description: Demineralizing Shampoo  
Material Submitted: One (1) Bottle of Shampoo

**WORK REQUESTED:**

Test Method: ASTM D7706-11 (March 2011)  
Acceptance Criteria: OSHA Concentration limits  
Method Deviations: Testing was completed without any known deviations.

**CONCLUSIONS**

The hair care product sample was tested for total volatile organic compounds (TVOCs), and individual VOCs including formaldehyde over a 20 min exposure period. Detailed emissions data for individual VOCs are provided in Tables 3 and 4. Predicted building air concentrations for the salon scenarios are listed in Table 6, respectively. These results were compared to the emission limits specified by OSHA. The hair care product sample does meet the OSHA emissions limits concerning formaldehyde following the scenario described herein.

## 1. Chamber Emission Tests

### 1.1 Test Summary:

The custom emissions testing were performed with reference to ASTM D6196-03, "Standard Practice for Selection of Sorbents, Sampling, and Thermal Desorption Analysis Procedures for Volatile Organic Compounds in Air", ASTM D5197-09, "Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology)", and ASTM D7706-11, "Standard Practice for Rapid Screening of VOC Emissions from Products Using Micro-Scale Chambers". Samples were collected and weighed in an aluminum weigh boat and placed directly into micro-scale chambers. Micro-chambers were held at a constant temperature of 23°C and 300 mL/min flow rate for aldehydes and 200 mL/min for VOC during the test. Air sampling was performed for a 20 minute time period. Samples analyzed for TVOC were collected on multi-sorbent tubes containing Tenax TA 35/60 backed by Carbograph 5 TD 40/60. These VOC samples were analyzed by thermal desorption-gas chromatography/mass-spectroscopy, TD-GC/MS. TVOC was calculated through integration of the chromatogram from n-hexane through n-hexadecane using toluene as a surrogate. Samples analyzed for low molecular weight aldehydes were collected on cartridges treated with 2,4-di-nitrophenylhydrazine (DNPH). Low molecular weight aldehydes were analyzed using high pressure liquid chromatography, HPLC.

### 1.2 Test Conditions and Parameters Used:

**Table 1:** Parameters of Chamber Testing, Symbols, and Units

Parameter	Symbol	Value	Units
Exposed Sample Mass (aldehyde)	$A_{ma}$	0.37026	g
Exposed Sample Mass (VOC)	$A_{mv}$	0.08261	g
Inlet Air Flow Rate (Aldehyde)	$Q_a$	300	$m^3 h^{-1}$
Inlet Air Flow Rate (VOC)	$Q_v$	200	$m^3 h^{-1}$
Average Temperature (Range)		$23 \pm 2^\circ C$	$^\circ C$

### 1.3 Test Results

Chamber background concentrations measured at time zero are reported in Table 2. Formaldehyde and TVOC results are reported in tables 3 and 4.

**Table 2:** Test chamber background VOC concentrations in  $\mu g m^{-3}$ .

Compound	CAS No.	$C_{i0, Room Temp}$
Formaldehyde	50-00-0	2.21
TVOC	-	BDL*

\*BDL – Below Detection Limits

**Table 3:** Test chamber TVOC and formaldehyde concentrations in  $\mu\text{g m}^{-3}$ .

Compound	CAS No.	Chamber Concentration
Formaldehyde	50-00-0	190.1
TVOC	-	9913

**Table 4:** TVOC and formaldehyde emission factors.

Compound	CAS No.	Total Emissions ( $\mu\text{g/g}$ )	Emission per 3fl oz ( $\mu\text{g/use}$ )
Formaldehyde	50-00-0	3.05	281
TVOC	-	480	44290

The measured chamber concentrations and corresponding emission factors of identified individual VOCs and TVOCs are listed in Tables 3 and 4.

In Table 4, emission factors were calculated using equation 1 below:

$$EF_{Ai} = \frac{Q \times (C_{it} - C_{i0})}{A_g}$$

The inlet flow rate,  $Q$  ( $\text{m}^3 \text{h}^{-1}$ ), is the measured flow rate of air into the chamber. The chamber concentration,  $C_{it}$  ( $\mu\text{g m}^{-3}$ ), is the concentration of a target VOC<sub>i</sub>, formaldehyde and other carbonyl compounds measured at time  $t$ . The chamber background concentration,  $C_{i0}$  ( $\mu\text{g m}^{-3}$ ), is the corresponding concentration measured with the chamber operating without a test specimen. The exposed projected sample mass of the test specimen in the chamber,  $A_g$  (g), is determined from the measurements made at the time of specimen preparation.

## 2. Exposure Scenario Modeling and Evaluation

Estimated building concentrations for the commercial salon scenarios were calculated using equation 2 below:

$$C_{Bi} = \frac{EF_M \times U_h}{Q_B}$$

The mass specific emission factor  $EF_M$  ( $\mu\text{g/g}$ ) is multiplied by the ratio of the mass used per hour (assuming 3 fluid ounces per use and 3 uses per hour),  $U_h$  ( $\text{gh}^{-1}$ ), to the flow rate of outside ventilation air,  $Q_B$  ( $\text{m}^3\text{h}^{-1}$ ).

The modeling parameters used for commercial salon scenarios are listed in Table 5.

The modeled concentrations of identified individual VOCs for commercial salon scenario is listed in Table 6, respectively. Whether the modeled concentrations meet the maximum allowable concentration requirements specified by OSHA are also indicated.

**Table 5:** Standard Modeling Parameters for Salon Products

Parameter	Symbol	Value	Units
Uses per hour	$U_h$	3	$\text{h}^{-1}$
People Outdoor Air Rate <sup>1</sup>	$R_p$	10	$\text{L s}^{-1}\text{person}^{-1}$
Area Outdoor Air Rate <sup>1</sup>	$R_a$	0.6	$\text{L s}^{-1}\cdot\text{m}^2$
Minimum Floor area for <i>Commercial Salon</i> <sup>2</sup>	$A_B$	11.2	$\text{m}^2$
Outdoor air (OA) flow rate for <i>Commercial Salon</i> <sup>3</sup>	$Q_B$	96.1	$\text{m}^3 \text{h}^{-1}$
Building volume of <i>Commercial Salon</i>	$VB$	27.2	$\text{m}^3$

<sup>1</sup>Minimum Ventilation Rates In Breathing Zone based on ASHRAE 62.1-2007, Table 6-1 for Beauty and nail salons. The minimum ventilation requirement is  $10 \text{ L s}^{-1}\text{person}^{-1}$  and  $0.6 \text{ L s}^{-1}\cdot\text{m}^2$ . The minimum total outdoor flow rate is then  $96.1 \text{ m}^3 \text{h}^{-1}$  for a commercial salon.

<sup>2</sup>Floor area of commercial salon and washing station is based on local and state board of Cosmetology floor space requirements.

<sup>3</sup>Outdoor air (OA) flow rate is based on the presence of two individuals occupying each scenario.

**Table 6:** Projected concentration of formaldehyde using commercial salon scenario.

VOC	CAS No.	Projected Concentration (Commercial Salon) (ppm)	Allowable concentration specified by OSHA (ppm)	Meet maximum allowable concentration criteria?
Formaldehyde	50-00-0	0.007	0.75	Yes

### 3 Method Parameters and Comments:

**Table 12:** Facilities and Equipment.

Instrumentation Used:	Markes TD-100 Thermal Desorption Agilent 7890B GC Agilent 5977A MS Agilent 1260 HPLC
Column Used:	Agilent HP-ULTRA 2 (GC) Poroshell 120 EC-C18 (HPLC)

**Table 13:** HPLC Parameters.

Parameter	Value
Solvent A	Water
Solvent B	Acetonitrile
Solvent C	Tetrahydrofuran
Flow Rate	0.62 mL/min
Initial	56:30:14 A:B:C
Final	21:70:9 A:B:C
End Time	9.10 min
Detector wavelength	360 nm

**Table 14:** TD-GC/MS Parameters.

Parameter	Value
Thermal Desorption	
Tube Desorb Temperature	285 °C
Trap Temperature	0 °C
Trap Desorb Temperature	300 °C
Split ratio	50:1
Gas Chromatograph	
Initial Temperature	35 °C
Initial Time	5 min
Ramp Rate 1	4 °C/min
Temperature 2	120 °C
Ramp Rate 2	15 °C/min
Temperature 3	300 °C
Ramp Rate 3	10 °C/min
Final Temperature	310 °C
Final Temperature Hold	5 min

All data, including but not limited to raw instrument files, calibration fits, and quality control checks used to generate the test results are available to the client upon request.

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Appendix 1.



Figure 1: Sample use instructions.

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Chain Of Custody

 <p><b>Ship To:</b>                  A701 VOC Laboratory                  4700 Broadway SE                  Suite 200                  Monticello, MN 55121                  Phone: 612-485-7401</p>		<p><b>Chain of Custody for VOC Emission Test</b>                  A separate COC must be completed for EACH product/increase a sample.                  Intertek Terms &amp; Conditions are included in this worksheet. By submitting this worksheet, acknowledge and accept these terms &amp; conditions unless a note written on this COC.                  Intertek Qualification Number: C.U. 00354488                  Purchase Order (enter company's number):</p>	
<p><b>Customer Information</b>                  Company: Boreal USA LLC                  Street Address: 7900 Lake Eleanor Drive, Suite 144                  City/State/Zip/Costal code: Orlando, Florida, 32836                  Country: USA                  Contact Name &amp; title for repelling: Luis Lopez                  Contact Phone/Fax Numbers: 1 (237) 981-3883                  Contact E-mail Address: luiz@borealcosmetics.com                  Primary Responsibility Co. (if different):</p>		<p><b>Requested Test</b>                  Can emissions of smoke bar contain formaldehyde                  Type of product: Demineralizing Shampoo                  Target chemicals and chemical groups: Formaldehyde                  Modeling scenario: Indoor                  Test site (aka floor covering test only):                  Test results verification: Customer maintains as per Sample Prep, Test Type, Schedule, etc.</p>	
<p><b>Manufacturer Information (if different from customer)</b>                  Company:                  Country:                  Contract Name/ETC:                  Phone Number/E-mail Address:</p>		<p><b>Customer Request for Certification Program</b>                  Are you pursuing Intertek's ETL Environmental VOC Certification: <input checked="" type="checkbox"/> YES                  Are you pursuing Intertek's ETL Environmental VOC-Certification: <input checked="" type="checkbox"/> YES                  Are you pursuing ICC's Indoor Airways Certification: <input checked="" type="checkbox"/> YES                  Are you pursuing ICC's Indoor Airways Certification: <input checked="" type="checkbox"/> YES                  Are you pursuing ICC's Floorcoverings Certification: <input checked="" type="checkbox"/> YES</p>	
<p><b>Sample Details</b>                  Product (Customer Name/Altzer Alternative/Item System/Description/Shipping Weight) 1                  Product Customer Part No. (if not part of the name): BA                  Manufacturer Name &amp; Facility: D                  Date Manufactured: 08/27/2015                  Product Category &amp; Use: Demineralizing Shampoo                  Sample Description/Label:                  Pallet Name &amp; Location: Boreal Cosmetics - 380 Paralel - Brazil                  Collection Location within Plant: Execution                  Date &amp; Time Collected: 11/20/2015                  Number of Sample Pallets: 1                  Photo of collection location: attach                  Sample Collected by: Leonardo                  Phone/Fax Numbers: +55 (11) 481-4056                  E-mail address: info@borealcosmetics.com</p>		<p><b>Customer Authorized Laboratory to Submit Copies of Test Report to:</b>                  Contact E-mail Address: luiz@boreal.com                  Organization: Boreal Business Group, LLC                  Contact E-mail Address: luiz@boreal.com                  Organization: Boreal Business Group, LLC</p>	
<p><b>Shipping Details</b>                  Packed &amp; shipped By: FEDEX                  Shipping Date: 11/21/2015                  Container/Vial Number</p>		<p><b>Intertek Use Only</b>                  Description of Shipping Package:                  Description of Sample:                  QIN:</p>	
<p><b>Sample Handling</b>                  Prepared Name:                  Reanalyzed By:                  Requested By: Taylor Gebben</p>		<p><b>Signature</b>                  Date: 11/23/15                  Company: Intertek</p>	