

### 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
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Product Sample Information	
Manufacturer / Location	Bionat Cosméticos – São Paulo-Brazil
Product Name	BB Cream Bio Reducer Mask Platinum
Product Category	Hair Straightening and Treatment
Commercial Part Number	126
Date of Manufacture	09/28/2015
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



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Reviewer / Senior Chemist

Report Certification Date: December 30, 2015

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**DESCRIPTION OF SAMPLES:**

Part Description: Hair Straightening and Treatment  
Material Submitted: One (1) Bottle of BB Cream Platinum

**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 formaldehyde over a 20 min exposure period. Detailed emissions data for individual VOCs are provided in Tables 4 and 5. Predicted building air concentrations for the salon scenarios are listed in Tables 7 and 8, respectively. The hair care product sample does meet the emissions limits concerning formaldehyde at both temperatures.

1. Chamber Emission Tests

1.1 Test Summary:

The 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 232°C (450°F) for high temperature and 23°C for room temperature. High temperature was selected based on manufacturer’s directions for use. Sampling was performed at 300 mL/min flow rate for aldehydes and 200 mL/min for VOC during the test. After a two minute equilibration period, to allow for the evaporation of water, 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-dinitrophenylhydrazine (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 at Room Temperature

Parameter	Symbol	Value	Units
Exposed Sample Mass (aldehyde)	$A_{ma}$	0.34837	g
Exposed Sample Mass (VOC)	$A_{mv}$	0.07034	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)		$23 \pm 2^\circ C$	$^\circ C$

**Table 2:** Parameters of Chamber Testing, Symbols, and Units at High Temperature

Parameter	Symbol	Value	Units
Exposed Sample Mass (aldehyde)	$A_{ma}$	0.16052	g
Exposed Sample Mass (VOC)	$A_{mv}$	0.05640	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)		$232 \pm 5^\circ C$	$^\circ C$

### 1.3 Test Results

Chamber background concentrations measured at time zero are reported in Table 3. Formaldehyde and TVOC results are reported in tables 4 and 5.

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

Compound	CAS No.	$C_{i0}$ (Room Temperature)	$C_{i0}$ (High Temperature)
Formaldehyde	50-00-0	1.27	22.2
TVOC	-	BDL*	86.3

\*BDL – Below Detection Limits

**Table 4:** Test chamber TVOC and formaldehyde concentrations in  $\mu\text{g m}^{-3}$ .

Compound	CAS No.	Chamber Concentration (Room Temperature)	Chamber Concentration (High Temperature)
Formaldehyde	50-00-0	2.03	5172
TVOC	-	BDL*	8989

\*BDL – Below Detection Limits

**Table 5:** TVOC and formaldehyde emission factors.

Compound	CAS No.	Total Emissions Room Temperature ( $\mu\text{g/g}$ )	Emission per 3fl oz ( $\mu\text{g/use}$ ) Room Temperature	Total Emissions High Temperature ( $\mu\text{g/g}$ )	Emission per 3fl oz High Temperature** ( $\mu\text{g/use}$ )
Formaldehyde	50-00-0	0.035	3.23	193	3567
TVOC	-	BDL*	BDL*	644	11877

\*BDL – Below Detection Limits

\*\*Emissions per use assumes a use of 3 fl oz and that 80% of product is removed from hair before heat is applied, as specified in manufacturer's directions for use.

The measured chamber concentrations and corresponding emission factors of identified individual VOCs and TVOCs are listed in Tables 4 and 5.

In Table 5, 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,  $C_{io}$  ( $\mu\text{g m}^{-3}$ ), is the corresponding concentration measured with the chamber operating without a test specimen. The exposed 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  $C_B$  for the commercial salon scenarios were calculated using equation 2 below:

$$C_B = \frac{EF_M \times U_h}{Q_B}$$

The mass specific emission factor  $EF_M$  ( $\mu\text{g/g}$ ) is multiplied by the ratio of the mass used per hour (assuming three fluid ounces per use and three 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 6.

The modeled concentration of formaldehyde for commercial salon scenario is listed in Tables 7 and 8, respectively. Whether the modeled concentrations meet the maximum allowable concentration requirements specified by OSHA are also indicated.

**Table 6:** 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 7:** Projected concentration of formaldehyde using commercial salon scenario at room temperature.

VOC	CAS No.	Projected Concentration (Commercial Salon) (ppm)	Allowable concentration specified by OSHA (ppm)	Meet maximum allowable concentration criteria?
Formaldehyde	50-00-0	< 0.001	0.75	Yes

**Table 8:** Projected concentration of formaldehyde using commercial salon scenario at high temperature.

VOC	CAS No.	Projected Concentration (Commercial Salon) <sup>1</sup> (ppm)	Allowable concentration specified by OSHA (ppm)	Meet maximum allowable concentration criteria?
Formaldehyde	50-00-0	0.091	0.75	Yes

<sup>1</sup>Emissions were reduced by 80% per product use guide indicating the removal of up to 80% of product before heat is applied.

### 3 Method Parameters and Comments:

**Table 9:** 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 10:** 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 11:** 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.

Appendix 1:


	
<h2>BB CREAM</h2> <h3>BIO REDUCER MASK PLATINUM</h3> <h1>STEP BY STEP</h1>	
<h4>Thick and Resistant Hair</h4> <p><b>How to apply:</b></p> <ol style="list-style-type: none"><li>1. Divide the unwashed hair into four sections, and apply a small amount of Bio Reducer Mask Platinum section-by-section, leaving 0.5" distance between the scalp and the hair without product. Use a small tooth comb to work the product from root to end.</li><li>2. Leave in the product for 40 minutes.</li><li>3. Rinse out 80% of the product and with a towel squeeze some water out of the hair.</li><li>4. Blow dry the hair 100% of the way.</li><li>5. Divide the hair into four sections, and begin using a flat iron to further straighten the hair. Be sure to flat iron the hair well where it is more resistant. This step is very important to achieve the results provided by the treatment.</li></ol>	<h4>Thin, Sensitive and Fragile Hair</h4> <p><b>How to apply:</b></p> <ol style="list-style-type: none"><li>1. Wash the hair and with a towel squeeze some 80% water out of the hair then divide into four sections, and apply Bio Reducer Mask Platinum, section-by-section, leaving 0.5" distance between the scalp and the hair without product. Use a small tooth comb to work the product from root to end.</li><li>2. Leave in for 20 to 30 minutes, according to professional evaluation previously performed.</li><li>3. Rinse out 100% of the product and with a towel squeeze some water out of the hair.</li><li>4. Blow dry the hair 100%.</li><li>5. Begin using a flat iron to further straighten the hair. Be sure to flat iron the hair well where it is more resistant.</li></ol>
<p><b>WARNING:</b></p> <ul style="list-style-type: none"><li>• Before using the product make a test on a small lock of hair to make sure it will not leave residues of the blue pigment.</li><li>• Do not use this product in very light blond hair. Use BB Cream Bio Reducer Mask Organic instead.</li><li>• Don't set the flat iron's temperature above 450 °F on healthy hairs and 356 °F on hair with weak and extra dry ends. This is very important to achieve the results provided by the treatment without damaging the ends.</li><li>• Before using the flat iron, spray heat protectant on the hair.</li><li>• Do not use more than 3 fl oz per treatment.</li><li>• This product can fade hair color.</li></ul>	

Figure 1. Manufacturer Use Instructions

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<b>Shipping Details</b> Product Commercial Name: PB Cream 310 Reduce Make Plidrum Product Commercial Part No (if not part of the name): 129 Manufacturer Sample Tracking ID: Date Manufactured: 08/28/2015 Precursor Category & Use: Heat Straightening and Treatment Sample Contamination Material: Plant Name & Location: Bional Cosmetics - 850 Paulo Brazil Collection Location within Plant: Exposed Date & Time Collected: 11/09/2015 Number of Samples Pieces: 1 Sample Collected By: Leonardo Phone/Fax Numbers: +55 11 4611-4005 E-mail Address: info@bionalcosmetics.com		<b>Shipping Details</b> Package & Shipper: BY FEDEX Shipping Date: 11/11/2015 Carrier/Label Number:	
<b>Sample Handling</b> Preparer Name:		Intertek Use Only Condition of Shipping Package Condition of Sample: S/N:	
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