



YAKIMA CHIEF - HOPUNION LLC

# CERTIFICATE OF ANALYSIS

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Supplier: Yakima Chief-Hopunion, LLC  
203 Division Street  
Yakima, WA 98902

Date of Issue: 09-Oct-2017

Product Name: Type 90 Hop Pellets

Lot Number: P92-ZKUMOS5151  
Variety: Mosaic® Brand  
Crop Year: 2016

<u>Characteristic</u>	<u>Typical Analysis</u>	<u>Actual Analysis</u>																
Alpha Acids:	2.5 - 17.5% (w/w) UV Spectro by ASBC HOPS - 6A	10.8%																
Beta Acids:	3.0 - 9.0% (w/w) UV Spectro by ASBC HOPS - 6A	3.2%																
Hop Storage Index	Varies by Variety and Time from Harvest Hop Storage Index by ASBC Hops - 12	0.242																
Oil by Distillation:	Varies by Variety ASBC Hops - 13 (%v/w)	1.4%																
Oil Profile by GC, EBC Analytica V 7.12:	<table border="0"> <tr> <td><b>B-Pinene:</b></td> <td>0.7 %</td> <td><b>Farnesene:</b></td> <td>0.1 %</td> </tr> <tr> <td><b>Myrcene:</b></td> <td>53.3 %</td> <td><b>Humulene:</b></td> <td>13.1 %</td> </tr> <tr> <td><b>Linalool:</b></td> <td>0.6 %</td> <td><b>Geraniol:</b></td> <td>0.9 %</td> </tr> <tr> <td><b>Caryophyllene:</b></td> <td>5.3 %</td> <td></td> <td></td> </tr> </table>	<b>B-Pinene:</b>	0.7 %	<b>Farnesene:</b>	0.1 %	<b>Myrcene:</b>	53.3 %	<b>Humulene:</b>	13.1 %	<b>Linalool:</b>	0.6 %	<b>Geraniol:</b>	0.9 %	<b>Caryophyllene:</b>	5.3 %			
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<b>Caryophyllene:</b>	5.3 %																	

Lead:	< 1.0 ppm	passes test
Arsenic:	< 0.5 ppm	passes test
Cadmium:	< 0.03 ppm	passes test
Total Heavy Metals:	< 10 ppm (asPb)	passes test

Missy Raver  
Quality Control Manager