

HOP QUALITY REPORT CERTIFICATE OF ANALYSIS

To: Wisconsin Hop Exchange

Sample ID: 22EMS1087-01LH

Variety: Emerald Spire™

Whole Cone ☐

Date : 12/3/2022

Pellet ☒

Certifying Officer: Zach Lilla - Lab Manager
TTB Certified Chemist - Member AOAC - ASBC - BJCP

Method																									
Hops-4C	Moisture Analysis																								
	<table><tr><td>% Moisture</td><td>9.6</td></tr><tr><td>% Dry Matter</td><td>90.4</td></tr></table>	% Moisture	9.6	% Dry Matter	90.4																				
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AAR	Xanthohumol by HPLC																								
	<table><tr><td>NT</td><td>mg/g</td></tr></table>	NT	mg/g																						
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Hops-12	Hop Storage Index																								
	<table><tr><td>HSI</td><td>0.270</td></tr></table>	HSI	0.270																						
HSI	0.270																								
Hops-13	Essential Oil by Steam Distillation																								
	<table><tr><td>mL/100g</td><td>1.44</td></tr></table>	mL/100g	1.44																						
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Hops-14	Alpha and Beta Acids by HPLC																								
ICE-3																									
	<table><tr><td>Cohumulone</td><td>36.9</td><td>(% of Total AA)</td></tr><tr><td>% Alpha Acids</td><td>7.06</td><td></td></tr><tr><td>Colupulone</td><td>62.6</td><td>(% of Total BA)</td></tr><tr><td>% Beta Acids</td><td>3.94</td><td></td></tr><tr><td>a/b ratio</td><td>1.79</td><td></td></tr></table>	Cohumulone	36.9	(% of Total AA)	% Alpha Acids	7.06		Colupulone	62.6	(% of Total BA)	% Beta Acids	3.94		a/b ratio	1.79										
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Hops-17	Hop Essential Oil by GC-FID																								
	(as is)																								
	<table><tr><td></td><td>% area</td><td>mg/100g</td></tr><tr><td>B-Pinene</td><td>NT</td><td>NT</td></tr><tr><td>Myrcene</td><td>NT</td><td>NT</td></tr><tr><td>Linalool</td><td>NT</td><td>NT</td></tr><tr><td>Caryophyllene</td><td>NT</td><td>NT</td></tr><tr><td>Farnesene</td><td>NT</td><td>NT</td></tr><tr><td>Humulene</td><td>NT</td><td>NT</td></tr><tr><td>Geraniol</td><td>NT</td><td>NT</td></tr></table>		% area	mg/100g	B-Pinene	NT	NT	Myrcene	NT	NT	Linalool	NT	NT	Caryophyllene	NT	NT	Farnesene	NT	NT	Humulene	NT	NT	Geraniol	NT	NT
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Humulene	NT	NT																							
Geraniol	NT	NT																							

NT=NOT TESTED

Signed: _____

Zachary Lilla - Lab Manager - TTB Certified Chemist

AAR LAB - ADVANCED ANALYTICAL RESEARCH

2517 Advance Rd Ste. A Madison WI 53718



AROMA QUALITY (AQ) HOP QUALITY REPORT

Customer : Wisconsin Hop Exchange

Sample ID: 22EMS1087-01LH

Variety: Emerald Spire™

Whole Cone ☐

Pellet ☒

Date : 12/3/2022



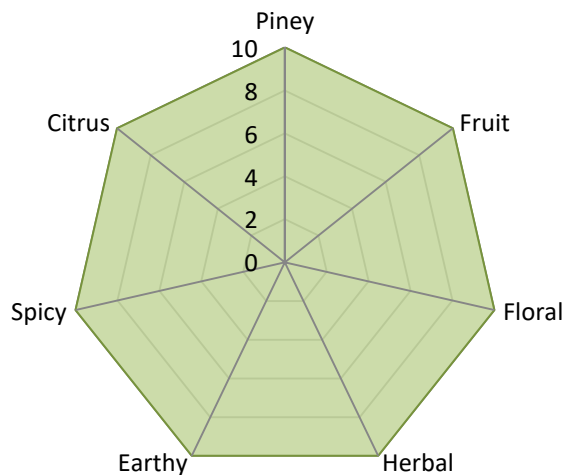
Certifying Officer: Zach Lilla - Lab Manager
TTB Certified Chemist - Member AOAC - ASBC - BJCP

% Moisture	9.6	Typical Range	8 - 12%	☒
HOP QUALITY (adjusted to 10% moisture)				
Total Oil ml/100g	1.43		1.0 - 2.0 mL	☒
cohumulone	36.9		35 - 37%	☒
Alpha Acids	7.03		9.0 - 13%	☐
Beta Acids	3.92		3.5 - 4.5%	☒

AROMA QUALITY (AQ)

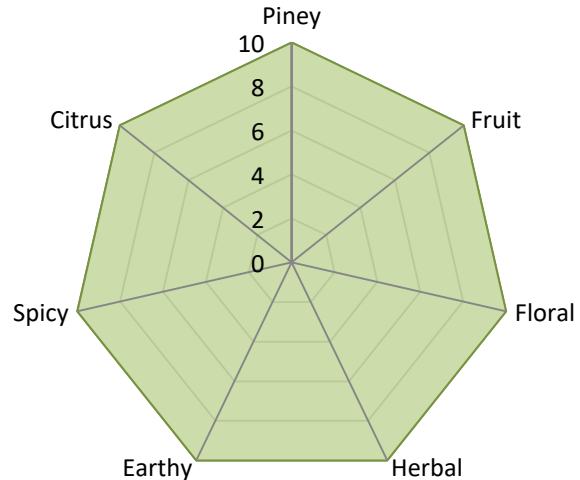
	% Area		mg/mL of Hop Oil			mg/100g of Hops (@10%H2O)		
B-Pinene	NT	0.50 - 1.00 %	NT	5 - 10		NT	5 - 20	
Myrcene	NT	30.00 - 40.00 %	NT	300 - 400		NT	300 - 800	
Linalool	NT	0.70 - 1.20 %	NT	7 - 12		NT	7 - 24	
Caryophyllene	NT	6.00 - 8.00 %	NT	60 - 80		NT	60 - 160	
Farnesene	NT	0.01 - 1.00 %	NT	0.1 - 10		NT	0.1 - 20	
Humulene	NT	9.00 - 12.00%	NT	90 - 120		NT	90 - 240	
Geraniol	NT	0.20 - 1.00 %	NT	2 - 10		NT	2 - 20	

AQ vs VARIETY SPECS



Aroma Intensity= 100

AQ vs ALL HOP VARIETIES



Aroma Intensity= 100

Signed: _____

Zachary Lilla - Lab Manager - TTB Certified Chemist

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