

## HOP QUALITY REPORT CERTIFICATE OF ANALYSIS

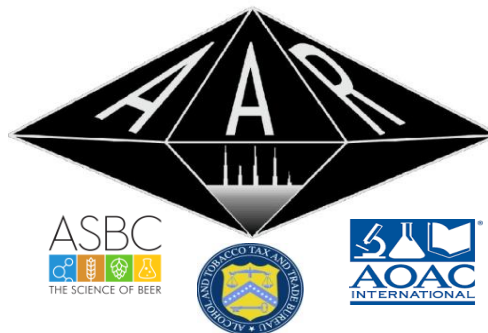
To: Wisconsin Hop Exchange

Sample ID: 20CAS0078

Variety: Cascade

Product: T-90 Pellet

Date : 7/2/2025



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

| Method        |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |        |         |          |    |    |         |    |    |          |    |    |               |    |    |           |    |    |          |    |    |          |    |    |
|---------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------|---------|----------|----|----|---------|----|----|----------|----|----|---------------|----|----|-----------|----|----|----------|----|----|----------|----|----|
| Hops-4C       | Moisture Analysis                      | % Moisture 10.3<br>% Dry Matter 89.7                                                                                                                                                                                                                                                                                                                                                                                                                |  |        |         |          |    |    |         |    |    |          |    |    |               |    |    |           |    |    |          |    |    |          |    |    |
| AAR           | Xanthohumol by HPLC                    | NT mg/g                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |        |         |          |    |    |         |    |    |          |    |    |               |    |    |           |    |    |          |    |    |          |    |    |
| Hops-12       | Hop Storage Index                      | HSI 0.349                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |        |         |          |    |    |         |    |    |          |    |    |               |    |    |           |    |    |          |    |    |          |    |    |
| Hops-13       | Essential Oil by Steam Distillation    | mL/100g 1.13                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |        |         |          |    |    |         |    |    |          |    |    |               |    |    |           |    |    |          |    |    |          |    |    |
| Hops-14       | Alpha and Beta Acids by HPLC           | Cohumulone 35.1 (% of Total AA)                                                                                                                                                                                                                                                                                                                                                                                                                     |  |        |         |          |    |    |         |    |    |          |    |    |               |    |    |           |    |    |          |    |    |          |    |    |
| ICE-3         |                                        | % Alpha Acids 5.88                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |        |         |          |    |    |         |    |    |          |    |    |               |    |    |           |    |    |          |    |    |          |    |    |
|               |                                        | Colupulone 50.5 (% of Total BA)                                                                                                                                                                                                                                                                                                                                                                                                                     |  |        |         |          |    |    |         |    |    |          |    |    |               |    |    |           |    |    |          |    |    |          |    |    |
|               |                                        | % Beta Acids 5.84                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |        |         |          |    |    |         |    |    |          |    |    |               |    |    |           |    |    |          |    |    |          |    |    |
|               |                                        | a/b ratio 1.01                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |        |         |          |    |    |         |    |    |          |    |    |               |    |    |           |    |    |          |    |    |          |    |    |
| Hops-17       | Hop Essential Oil by GC-FID<br>(as is) | <table><thead><tr><th></th><th>% area</th><th>mg/100g</th></tr></thead><tbody><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></tbody></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 |
|               | % 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                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |        |         |          |    |    |         |    |    |          |    |    |               |    |    |           |    |    |          |    |    |          |    |    |

NT=NOT TESTED

Signed: \_\_\_\_\_

Zachary Lilla - Lab Manager - TTB Certified Chemist  
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# AROMA QUALITY (AQ)

## HOP QUALITY REPORT

Customer : Wisconsin Hop Exchange

Sample ID: 20CAS0078

Variety: Cascade

Product: T-90 Pellet

Date : 7/2/2025



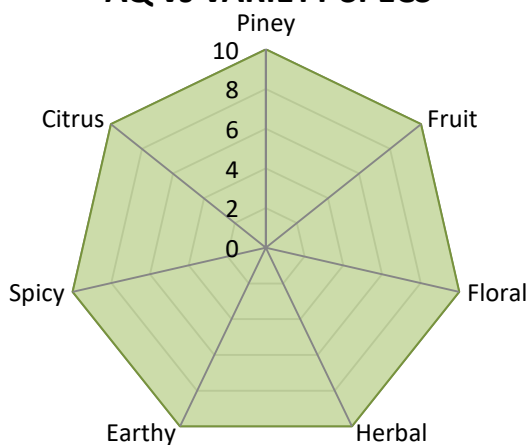
Certifying Officer: Zach Lilla - Lab Manager  
TTB Certified Chemist - Member AOAC - ASBC - BJCP

|                                               |      |                           |   |
|-----------------------------------------------|------|---------------------------|---|
| % Moisture                                    | 10.3 | Typical Range<br>8 - 12 % | ✓ |
| <b>HOP QUALITY (adjusted to 10% moisture)</b> |      |                           |   |
| Total Oil ml/100g                             | 1.14 | 0.8 - 2.5 mL              | ✓ |
| cohumulone                                    | 35.1 | 30 - 35%                  | ↑ |
| Alpha Acids                                   | 5.90 | 5.5 - 9%                  | ✓ |
| Beta Acids                                    | 5.86 | 6.0 - 7.5%                | ↓ |
| Myrcene                                       | NT   | 45.00 - 60.00 %           |   |

### AROMA QUALITY (AQ)

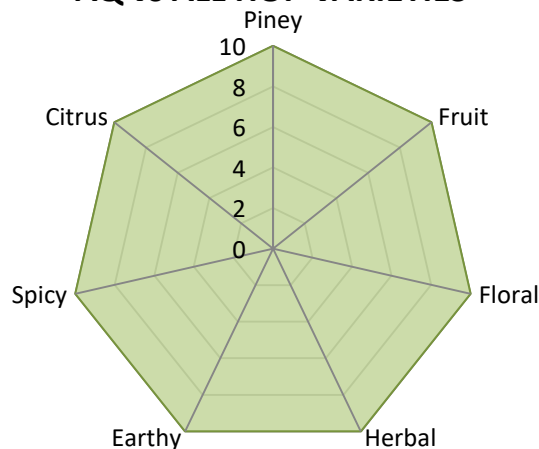
|               | % Area |                 | mg/mL of Hop Oil |           |  | mg/100g of Hops (@10%H2O) |            |  |
|---------------|--------|-----------------|------------------|-----------|--|---------------------------|------------|--|
| B-Pinene      | NT     | 0.50 - 0.80 %   | NT               | 5 - 8     |  | NT                        | 4 - 20     |  |
| Myrcene       | NT     | 45.00 - 60.00 % | NT               | 450 - 600 |  | NT                        | 360 - 1500 |  |
| Linalool      | NT     | 0.30 - 0.60 %   | NT               | 3 - 6     |  | NT                        | 2.4 - 15   |  |
| Caryophyllene | NT     | 5.00 - 9.00 %   | NT               | 50 - 90   |  | NT                        | 40 - 225   |  |
| Farnesene     | NT     | 6.00 - 9.00 %   | NT               | 60 - 90   |  | NT                        | 48 - 225   |  |
| Humulene      | NT     | 14.00 - 20.00 % | NT               | 140 - 200 |  | NT                        | 112 - 500  |  |
| Geraniol      | NT     | 0.01 - 0.30 %   | NT               | 0.1 - 3   |  | NT                        | 0.08 - 7.5 |  |

### AQ vs VARIETY SPECS



Aroma Intensity= 100

### AQ vs ALL HOP VARIETIES



Aroma Intensity= 100

Signed: \_\_\_\_\_

*Zachary Lilla*

Zachary Lilla - Lab Manager - TTB Certified Chemist

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