

“Certificate of Analysis”

Aug 30, 2011

Refuel Systems Inc Filters
System #1 Regular Pleat filter

Attention: Chris Curtis

Six **FUEL SAMPLES** from system #1 were submitted to AGAT Laboratories for examination of retained debris. The material was observed by microscopic examination of a 0.8 micron and 0.45 micron membranes with the following results:

Tag# 119645: System #1 (beginning sample)

- Amount used: For 0.8 μm membrane 80.9799g
- Amount used: For 0.45 μm membrane 80.4950g
- 0.8 μm membrane: 0.0117 g (0.01444 % w/w)
- 0.45 μm membrane: 0.0077 g (0.00956 % w/w)

Tag# 119646: Sample #1 (first pass)

- Amount used: For 0.8 μm membrane 80.4655
- Amount used: For 0.45 μm membrane 80.8683
- 0.8 μm membrane: 0.0065g (0.00807% w/w)
- 0.45 μm membrane: 0.0029g (0.00358% w/w)

Tag# 119647: Sample #1 (5 mins)

- Amount used: For 0.8 μm membrane 80.1624
- Amount used: For 0.45 μm membrane 80.8683
- 0.8 μm membrane: 0.0041g (0.00511% w/w)
- 0.45 μm membrane: 0.0022g (0.00273% w/w)
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Tag# 119648: Sample #1 (10 mins)

- Amount used: For 0.8 μm membrane 80.6462
- Amount used: For 0.45 μm membrane 80.9289
- 0.8 μm membrane: 0.0020g (0.00247% w/w)
- 0.45 μm membrane: 0.0149g (0.01841% w/w)

Tag# 119649: Sample #1 (15 mins)

- Amount used: For 0.8 µm membrane 80.8722
- Amount used: For 0.45 µm membrane 80.6890
- 0.8 µm membrane: 0.0063g (0.00779% w/w)
- 0.45 µm membrane: 0.0006g (0.00074% w/w)

Tag# 119650: Sample #1 (20 mins)

- Amount used: For 0.8 µm membrane 80.6423
- Amount used: For 0.45 µm membrane 80.6435
- 0.8 µm membrane: 0.0051g (0.00632 % w/w)
- 0.45 µm membrane: 0.0016g (0.00198 % w/w)

0.8 µm membrane: sample #1 beginning sample and 1st pass

The basic formula $((\text{Unfiltered Wt} - \text{Filtered Wt}) / \text{Sample Wt}) * 100 = \text{Particulate Wt } \%$

Unfiltered Wt - Filtered Wt = Total particulate weight

$$(0.00807\% \text{ w/w}) / (0.01444 \% \text{ w/w}) = 0.55886 \%$$

The Wt percentage of particulate of size 0.8 µm or larger removed by the filter for sample #1 first pass is:

$$100\% - 0.55886\% = 99.4411\%$$

0.45 µm membrane: sample #1 beginning sample and 1st pass

The basic formula $((\text{Unfiltered Wt} - \text{Filtered Wt}) / \text{Sample Wt}) * 100 = \text{Particulate Wt } \%$

Unfiltered Wt - Filtered Wt = total particulate weight

$$(0.00358\% \text{ w/w}) / (0.00956 \% \text{ w/w}) = 0.37448\%$$

The Wt percentage of particulate of size 0.45 µm or larger removed by the filter for sample #1 first pass is:

$$100\% - 0.37448\% = 99.6255\%$$

According to these results, it shows that the Filter has removed successfully 99.44 % w/w of particulates of size 0.8 µm or greater and 99.63 % w/w of particulates of size 0.45 µm or greater.



Sample	Wt % of particulate of 0.80 μm or greater removed by filter
Sample #1 (5 mins)	99.65
Sample #1 (10 mins)	99.83
Sample #1 (15 mins)	99.46
Sample #1 (20 mins)	99.56
Sample	Wt % of particulate of 0.45 μm or greater removed by filter
Sample #1 (5 mins)	99.71
Sample #1 (10 mins)	98.07
Sample #1 (15 mins)	99.92
Sample #1 (20 mins)	99.79

If you have any further questions regarding this analysis please contact me at 403-299-2149 or perrin@agatlabs.com

Sincerely,

AGAT LABORATORIES

A handwritten signature in blue ink, appearing to be "CP", is displayed on a light yellow rectangular background.

Charlotte Perrin
Tribology Division
Client Project Manager