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Submitted By:
Matt Fielder
Parker Filter Division Europe

Comparing Particle Counting with Gravimetric Analysis

The introduction of the ACM20 for use in jet fuel applications has been very well received. One area that is slowing the widespread adoption of the ACM20 is the lack of understanding in the results provided by particle counts when compared to existing gravimetric analysis.

The new ACM20 will replace current subjective methods of fluid monitoring still in use today for checking and maintaining the quality of today's modern aviation fuels, from the point of manufacture through the distribution system to the point of uplift into the wing.

The ACM20 is designed to be easy to use and fast to provide results. These accurate downloadable results can be manipulated to provide valuable predictive maintenance statistics.

In reality there is no direct correlation between particle counts and mass of contamination due to the unknown particulate material. In other words the density is unknown.

The results of knowing particle counts per ml has a much greater impact upon understanding the wear caused to critical components in the system, and also the performance of filtration products. However, when using an assumed density based on the average known densities of various contaminates, ranging from Silica, Quartz, clay and Iron Oxide, we can provide an estimated gravimetric report per ml.

The calculation used to determine the density of the particulates is shown overleaf.

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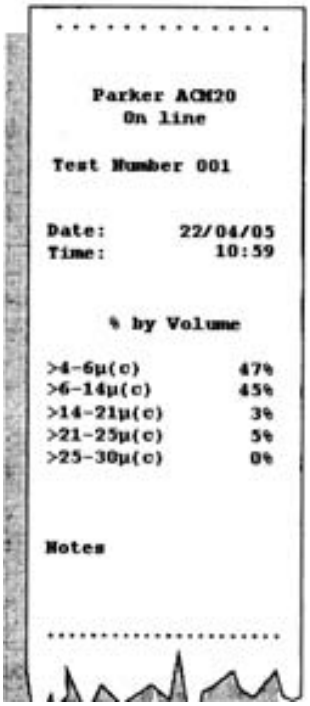
ACM20 MAP Continued….

And now for the science

It should be reiterated that this calculation is based on an assumed density and assumed spherical particle sizes. To explain, using the differential count, the numbers of particles between 2 channels, i.e. 4µ(c) - 6µ(c), we assume a mean particle size of 5µ(c) and so on up the range, 10µ(c), 17µ(c), 23.5µ(c) and 27.5µ(c).

By knowing these differential counts we can provide an inference as to the mass of the contamination contained in the reported sample and also allow new users to base reports on known contamination standards.

It should be noted that, at this time, the calculation is made using an excel spreadsheet but it is planned, depending on industry feedback to incorporate this feature into the ACM20 software.


Parker ACM20
On line

Test Number 001

Date: 22/04/05
Time: 10:59

% by Volume

>4-6µ(c)	47%
>6-14µ(c)	45%
>14-21µ(c)	3%
>21-25µ(c)	5%
>25-30µ(c)	0%

Notes

An example is given below:

Particle Size Range	Particle Count/ml	Assumed Density	Mass/Channel mg/ml		Material	Desity kg/m³
4µc - 6µc	2,500	1.27E-13	0.31792		Silica/Sand (MTD)	1602
6µc - 14µc	1,000	1.02E-12	1.01735		Iron Oxide	4300
14µc - 21µc	70	5.45E-12	0.38167		Aluminium Oxide	1522
21µc - 25µc	20	1.24E-11	0.24756		Clay (Dry Excavated)	1089
25µc - 30µc	1	2.12E-11	0.02116		Quartz Sand	1201
	Total sample mass		**1.98566**			
					Average Density	**1943**

A greater depth of understanding is gained by using the gravimetric correlation method; this in turn gives a detailed insight into the system and allows the user to create an effective preventative maintenance plan.

Use this information as a great opportunity to 'Promote and Sell'.
Email success stories to: filtrationinfo@parker.com

Parker Hannifin (UK) Limited
Filter Division Europe
Churwell Vale, Shaw Cross Business Park
Dewsbury, WF12 7RD
Tel: +44 (0) 1924 487000, Fax: +44 (0) 1924 487038
Email: filtrationinfo@parker.com

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