



Wax Analysis by the New Ankersmid Heated Cell Module

Introduction

Many industries consume wax as raw material. Among them we can find candle manufacturers, packaging and paper industries, wood industry and rubber producers. Each industry has its own quality demands and needs of wax.

Wax is the main raw material for candle industry, hence in order to produce high quality candles – high quality wax is required. The most significant parameter in wax industry is its colour: the whiter- the better. The meaning of a white, clear and bright wax is a low content of particles. This target is to be achieved by using appropriate filters.

In order to evaluate filters' efficiency, particle size distribution in wax should be monitored. Using a wrong filter type as well as premature filter replacement can be prevented, resulting in both cleaner wax and reduction in maintenance costs. Since at room temperature wax is in its solid state it can not be introduced to any common particle size analyzer.

In addition, the existence of many possible "sources" that can "contribute" particles to the wax during its manufacturing process rule out laser diffraction based analyzers to measure this mixture of particles accurately.



The solution

By heating wax above 65^oc it becomes liquid. Then it can be measured like any other liquid sample. Based on this simple and basic fact Ankersmid has developed the HM-101/1: Heated Measurement cell.



Instrumentation and configuration

Ankersmid CIS-100/50 particle size and shape analyzer was used for wax samples analysis. The CIS systems laser channel use a unique time-size mapping called Time-Of-Transition (TOT) theory to directly measure particles' size distribution and concentration. Measurement relates solely and directly to particle size, rather than to secondary properties from which size may be inferred. This eliminates the need for pre-knowledge, such as sample refractive index as required by other technologies. The modularity of the system and its interchangeable cells modules allows optimal flexibility in sample preparation (wet or dry) and measurement phases. The Heated Measurement cell is based on the magnetic stirrer cell platform with an addition of a heat element, temperature resistance isolation materials and a temperature control unit that allows controlling the temperature up to 80 °c with a resolution of 0.1 °c.

Recommended set-up configuration for wax measurement is summed in table no. 1.

Table no. 1: Measurement Set-up Configuration

Laser lens	Type	Range [μ]
	Lens A-100/A	0.5-600
Measurement Cell	Magnetic Heated cell, model HM-101/1	
Dispersing Liquid	Not required	
Accessories	Temperature Control Unit	





Results

Samples taken at two sampling points were analyzed: feed sample and filtered sample. A new, type A filter was examined.

Figure no. 1 illustrates the same size distribution pattern. No difference in concentration was measured (values were taken from statistics results).

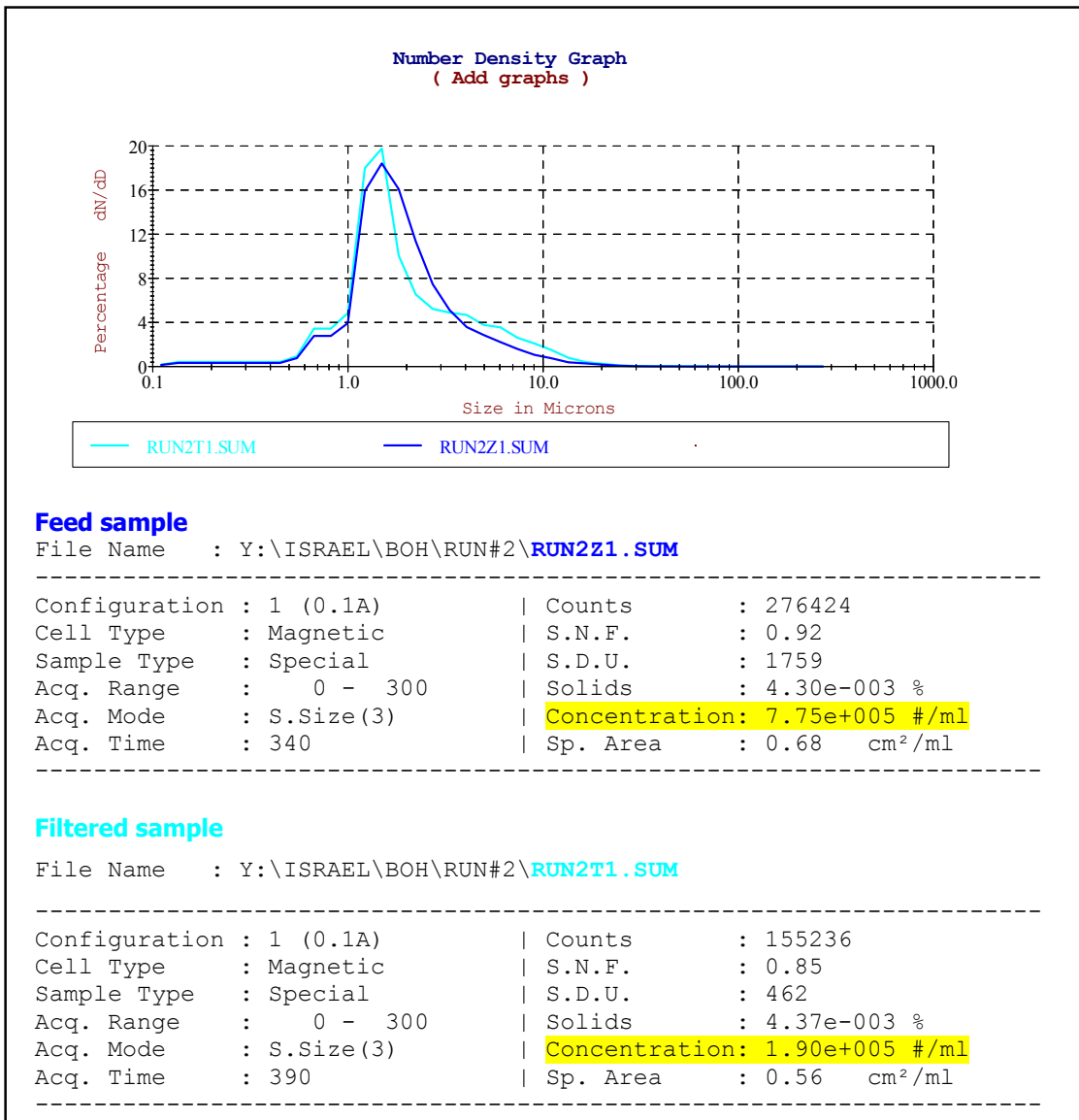


Figure no.1: Type A filter examination



Based on the results obtained with the CIS-100 system of 7 different runs made using filter type A, the filter type was changed.

Figure no. 2 describes results obtained using filter type B. Same size distribution pattern is shown. Lower concentration was measured in the filtered sample (values were taken out of statistics results).

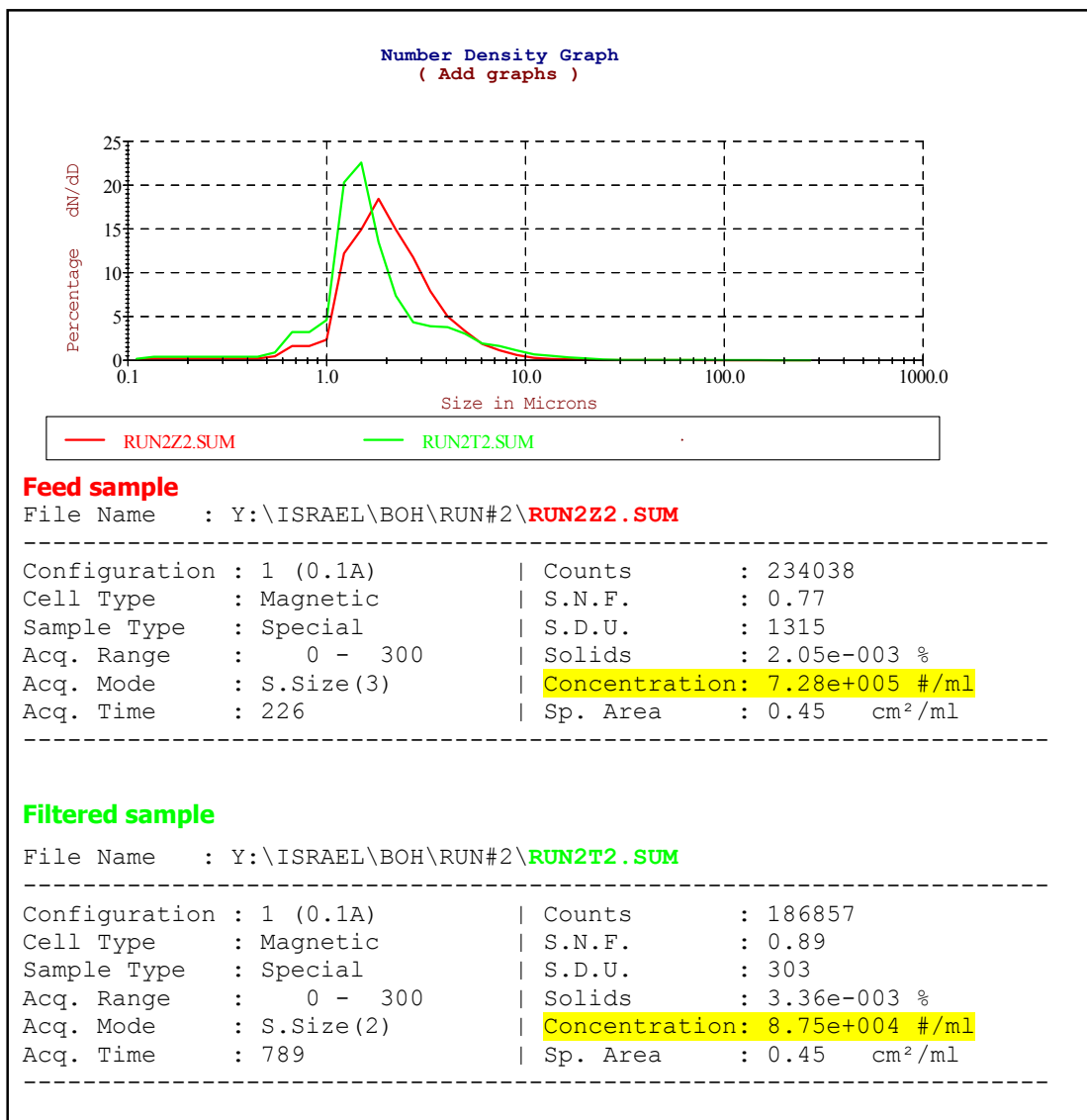


Figure no.2: Type B filter examination



Conclusion

The performance of the filter that was used in the wax process was low. Using a different filter type results

in similar particle size distribution pattern but a lower concentration of particles.

Summary

Monitoring particle size distribution in wax has an influential effect on the final product quality.

Using Ankersmid CIS-100/50 system and the new Heated Measurement cell allow perfect analysis of particles in wax. Higher quality product and lower maintenance costs are achieved in this way.

References

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2. Weiner, B. B.; Tscharnuter, W. W.; and Karasikov, N.; *Improvements in Accuracy and Speed Using the Time-of-Transition Method and Dynamic Image Analysis for Particle Sizing*, Theodore Provder, American Chemical Society, **1998**
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