Liquid Particle Explorer® Application Note

Identification of Particulate Matter - Reject Small Volume Parenteral

Sample Description

rap.ID test sample: Small volume parenteral (SVP) solution (50 ml) reject, these included white particles and fibers.

Purpose of Analysis

Parenterals are subject to high requirements in regards to purity. These parenteral solutions are regulated by the national pharmacopoeias and must be free of any visible particles (particle of 50 µm or more). Serious efforts in production and quality assurance are required in order to ensure this.

Therefore a 100% inspection of the parenterals is required. If contaminations occur it is possible through particle ID to identify and eliminate the particle source in the processes.

Procedure

The primary package of the product is opened and its content is sucked through an area with a diameter of 4 mm of the patented membrane filter.

The particle loaded area is then automatically analyzed with the Liquid Particle Explorer®. Each particle larger than 50 µm is identified by the system. The following parameters are used:

- exposure time per particle: 40 s
- automated picture analysis of 100 Fields (500 µm x 500 µm)
- minimum particle length >50 µm

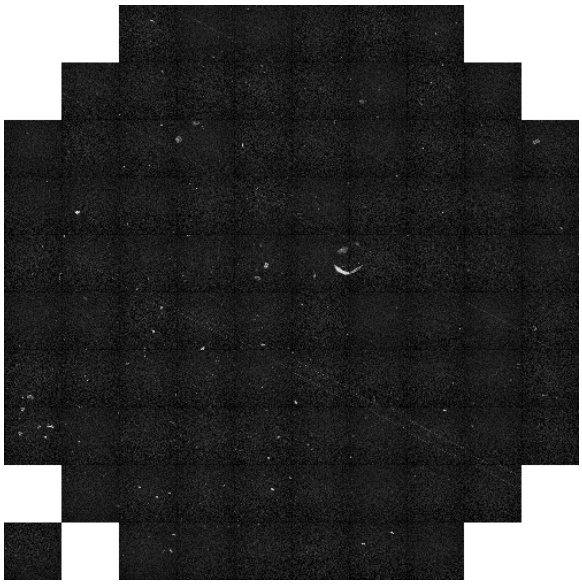

Figure 1: 89 automated generated scan fields.

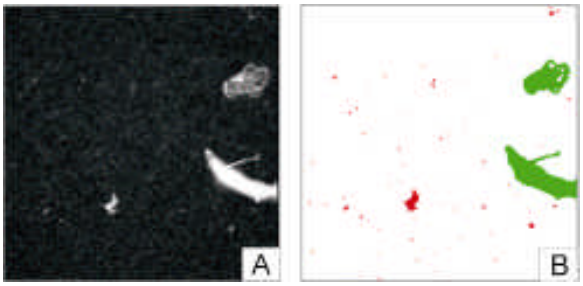

Figure 2:
A dark field picture of one field 500 µm x 500 µm
B picture analysis of A. Measured particles are marked in green, all other particles in red.

Results Summary

Substance	Number	Size	
-	-	>=50	>=100
Cellulose	4	4	0
Polyethylene	4	2	2
Total	8	6	2

Table 1: Identified Particle > 50 µm from the 50 ml SVP solution.

Each of the identified particles gave a recognizable spectra that was identified by the APSys - Identifier® database. The main product contamination of the test was identified as a polyethylene fiber. This large fiber was seen in the visual inspection and caused the reject. Some smaller PE particles were found as well. Four other smaller cellulose particles did not cause the actual reject, but these findings show that a cellulose source could cause trouble in the future.

Benefits

The identification of foreign particles from the reject of the small volume parenteral solution pointed directly to the source. It is possible to verify this result from the identification of sampled material from the production/filling line. These new samples from the production process can be added to the database by the user within minutes. With the APSys – Identifier® software the particle spectra can be easily compared with these samples, new databases can be generated for different products, materials or filling lines.

The examinations with the Liquid Particle Explorer® enable a statistically relevant and comparable conclusion about the chemical composition of the particles in a short time period. The main contamination sources can be detected on the basis of the particle spectrum of a product sample. Polyethylene was identified as the source and the cause of malfunction of the filling process was identified. It took three people 4 hours from the rejected product to the removal of the source.

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