■Research Brief

A study of the Ultrasonic Cleaning Process Indicator for the Washer-Disinfector with the Ultrasonic Cleaning System

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Background: At the Washer-Disinfector with the Ultrasonic Cleaning system (WDUC) used to reprocessing surgical instruments, the aluminium foil test is used in order to detect the ultrasonic energy level in cleaning solution of WDUC[1,2]. The erosion on the aluminium foil shows ultrasonic energy level. However, the aluminium foil test does not serve as a test with a process indicator of WDUC. Furthermore, preparation of the aluminium foil test are requires time, and the powder of aluminum foil which is generated by the result of erosion contaminates WDUC[3]. Accordingly it is desirable to provide alternative test device.

Objective: Creating the practical Ultrasonic Cleaning Process Indicator (UCPI) for WDUC by using the aluminium foil. Creating trial piece of UCPI for WDUC meets following requirements: 1) Possible to check ultrasonic energy level after all process including high temperature drying cycle of WDUC. 2) Not contaminate WDUC by the powder of aluminum foil. 3) Can be installed easily in the tray of WDUC.

Method: Aluminium foil was heat-sealed into polypropylene bag with propylene glycol as the trial piece of UCPI shown in Figure 1. The polypropylene band was attached and hooked at the tray of WDUC to keep vertical. Then the performance test of an experimental product of the process indicator was carried out by using a real WDUC. Precondition of WDUC is shown on Table 1.

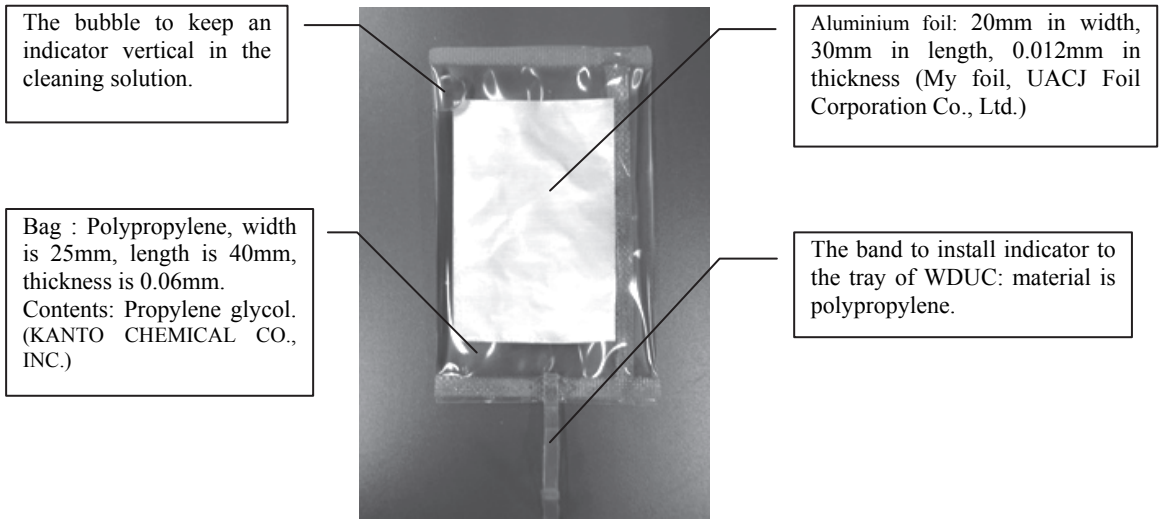

Figure 1. A trial piece.

Table 1. Precondition of WDUC.

Apparatus	SAKURA Automatic Ultrasonic and Jet Washer WUS Ⅱ-3100DXW, SAKURA SEIKI Co., Ltd.		
Program	Cycle name	Temperature	Time
	Preliminary washing	10 degree C	2min.
	Jet washing	45 degree C	5min.
	Ultrasonic washing Note: Frequency is 40kHz. Power is 2400W. Volume is 220L.	45 degree C	10min.
	Rinse	40 degree C	1min.
	Disinfection	90 degree C	5min.
	Drying	110 degree C	10min.

Result: After the performance test, pattern of the erosion on the aluminium foil was observed as shown in Figure 2 and also all of above issues were solved. The UCPI did not damage after ultrasonic washing cycle (45 degree C, 10 minutes) and high temperature drying cycle (110 degree C, 10 minutes) of WDUC. Additionally, it was observed that powder of aluminum foil was staying in of UCPI as shown Figure 2.

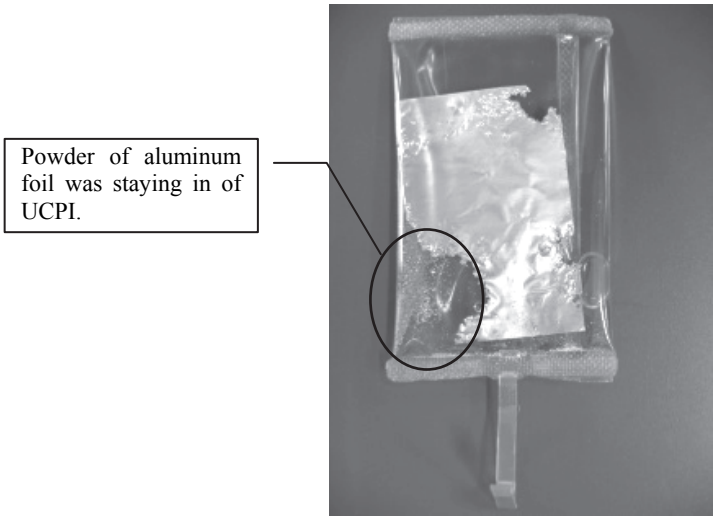

Figure 2. After the performance test.

Discussions: The trial piece of UCPI for WDUC was possible to check ultrasonic energy level after all process including high temperature drying cycle of WDUC. Also it did not contaminate WDUC by the powder of aluminum foil, and could be installed easily in the tray. Additionally this trial piece of UCPI can also be used for the ultrasonic cleaner.

Conclusion: This trial piece of the UCPI was confirmed to successfully detect the ultrasonic energy efficacy after processing with WDUC. Additionally, it is one-touch attachable to a tray of WDUC. Also it can be stuck in a scrapbook to be stored as a record.

■Reference

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