Assessment for virus-decontaminating / virus-inactivating processing of bedpan and urine bottles in the Flusher disinfector Typhoon SP6000 from Arjo

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Introduction

Flusher Disinfector / Bedpan washers are mainly used in patient care and therefore in a hygienically particularly sensitive area.

In order to ensure the safety of staff and patients from an unwanted contamination with microorganisms or viruses from faeces, the devices and processes used must have a comprehensive decontamination and disinfection performance in addition to the efficient cleaning of the items to be reprocessed.

The technique used for processing generally works at temperatures of more than 40 °C and is therefore comparable to a chemo-thermal processing procedure. According to the standards of the European Biocide Legislation, the effectiveness against viruses must therefore be confirmed with parvoviruses. Only this virus allows a thermal treatment process to be investigated, due to its high temperature stability. However, for the assessment of processes tested in this way, it is not decisive to control individual process steps, but the efficiency of the entire processing procedure, only.

Experimental Investigation

The device to be assessed was a Flusher Disinfector Typhoon SP6000 from Arjo.

Testing and proof of virus efficacy was carried out based on EN 17111 (2018)[1]. The test soil consists of bovine serum albumin, mucin and corn starch (RAMS) was carried out in accordance with the European Standard EN ISO 15883-3, 2005[3], but performed with parvovirus. The design of the complete test protocol in the machine itself was carried out in accordance with the European Standard EN ISO 15883-3, 2009[2].

For the investigation, the Flusher Disinfector was loaded according to the specifications of EN 15883-3 with bedpans, urine bottles and virus-contaminated germ carriers. In addition, virus-contaminated germ carriers were also fixed on the inner wall of the machine chamber.

The items to be washed were then treated according to the intensive cleaning and disinfection program P5 which includes the following processing steps:

- Rinse with cold water
- Rinse with mixed cold/hot water
- Rinse with hot water and Arjo Flusher Detergent
- Rinse with hot water
- Disinfection with the following settings:
    - o Disinfection temperature: 90 °C
    - o Disinfection time: 90 seconds
- Cooling and Arjo Flusher Rinse

At the end of the procedure, the carriers were recovered, eluted and the elution fluid was then titrated for residual parvovirus on A9 cells. Virus-contaminated germ carriers that were not subjected to the treatment process served as controls. In addition to the contaminated test specimens, a test carrier with the test soil only but without a virus suspension was included in each treatment process in order to check the cytotoxicity of process residues and other influences. Finally, the last rinse water was also examined for the presence of the test virus. The investigation was reproduced with three independent test approaches.

The tests were carried out in the HygCen test laboratory in Schwerin, Germany which is accredited for these kind of investigations, and are documented under the identification number SN 33282-I in the test facility.

Results

At an application titre of $10^{5,63}$ Tissue Culture Infectious Dosage$_{50}$ (TCID) (first and third test run) and $10^{5,50}$ TCID$_{50}$ of parvovirus per germ carrier (second test run), no residual parvovirus could be detected after undergoing the complete treatment cycle in all three test runs. In addition, no test virus could be found in the rinsing water at the end of the process either and a titre reduction, of ≥ 5 log$_{10}$ steps could therefore be documented by the overall process.

Furthermore the eluate of the carriers for checking cytotoxic effects did not show any cytotoxic effects. Thus cytotoxicity was less than 0.50 lg TCID$_{50}$.

Summary and Evaluation

Based on the previously described experimental investigation about the decontamination and disinfection of parvoviruses in the Flusher Disinfector Typhoon SP6000 from Arjo and in compliance with the disinfection parameters of 90 °C / 90 seconds contact time a comprehensive decontamination and disinfection efficacy can be certified. When the Intensive processing procedure is carried out a titre reduction of 5 log$_{10}$ steps and more can be expected. The use of parvovirus as a test virus corresponds to the requirements of the European guidelines for testing chemo-thermal virucidal disinfection processes.

Conclusion

The Flusher Disinfector Typhoon SP6000 from Arjo achieved a comprehensive virus-effective decontamination and disinfection effect against parvovirus and in accordance with the European Standard EN 17111. When the Intensive processing program P5 is carried out and the disinfection parameters of 90 °C / 90 seconds contact time are used, this **effectiveness can be expected against any other human pathogenic viruses, including rotaviruses, noroviruses, corona viruses or adenoviruses.**

Since Typhoon SP6000 and SP6000K are identical in construction of the chamber and technical parts related to the cleaning and disinfection process, it can be assumed that virucidal efficacy applies to all Typhoon models.

References

1. **European Standard EN 17111:** Quantitative carrier test for the evaluation of virucidal activity for instruments used in the medical area – Test method and requirements (phase 2, step 2).
2. **EN ISO 15883-3:** Requirements and tests for washer-disinfectors employing thermal disinfection for human waste containers, as of 2009.
3. **ISO/TS 15883-5:** Test soils and methods for demonstrating cleaning efficacy, as of 2005.

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