

Assessment for virus-decontaminating / virus-inactivating processing of bedpans and urine bottles in the Flusher Disinfector Tornado FD1800

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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 the Flusher Disinfector Tornado FD1800 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 15883-5, 2005³ 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, 2009².

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
- Rinse with hot water and Arjo Flusher Detergent
- Rinse with hot water
- Disinfection with the following settings:
 - Disinfection temperature: 91 °C
 - Disinfection time: 300 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. A virus-contaminated germ carrier that was not subjected to the treatment process served as a control.

In addition to the contaminated test specimens, a test carrier with the test soil only but without a virus suspension was

included in the processing process in order to check the cytotoxicity of residues and other influences. Finally, the last rinse water was also examined for the presence of the test virus.

The test was carried out in the HygCen test laboratory in Schwerin, Germany which is accredited for these kind of investigations, and is documented under the identification number SN 33745 I in the test facility.

Results

At an application titre of $10^{7.00}$ Tissue Culture Infectious Dosage₅₀ (TCID) of parvovirus per germ carrier, no residual parvovirus could be detected after undergoing the complete treatment cycle. In addition, no test virus could be found in the rinse water at the end of the process either and a titre reduction, significantly more than 4 log₁₀ steps could therefore be documented by the overall process.

Furthermore the eluate of the carriers for measuring cytotoxic effects did not show any cytotoxicity. Thus the cytotoxicity was less than 0.50 Ig TCID₅₀.

Summary and Evaluation

Based on the previously described experimental investigations about the decontamination and disinfection of parvoviruses in the Flusher Disinfector Tornado FD1800 from Arjo, and in compliance with the disinfection parameters of 91 °C / 300 seconds a comprehensive decontamination and disinfection efficacy against parvovirus can be certified. When the "Intensive" program P5 is carried out a titre reduction of ≥ 6.5 log steps can be observed. The use of parvovirus as a test virus corresponds to the requirements of the European Guidelines EN 17111 for testing chemo-thermal virucidal disinfection processes.

Conclusion

The Flusher Disinfector Tornado FD1800 from Arjo achieved a comprehensive virus-effective decontamination and disinfection efficacy against parvovirus in accordance with the European Standard EN 17111. When the selected intensive program P5 is carried out and the disinfection parameters of 91 °C / 300 seconds contact time are used, this **effectiveness can be expected against any other**

human pathogenic viruses, including rotaviruses, noroviruses, corona viruses or adenoviruses.

Since Tornado FD1800, FD1810 and FD1805 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 Tornado 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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