

# PERFORMANCE OF MEMBRANE BIO-INDICATORS IN LOW TEMPERATURE LAUNDRY DISINFECTION PROCESSES

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## SUMMARY

Nowadays, more and more laundries use chemical disinfection instead of thermal disinfection. This calls for the need of validation and constant measuring of the amount of reduction of micro-organisms.

The aim of this research was to show that a well known method for determining the disinfection (the **DES-controller**) is suitable for process testing, validation and RABC implementation at lower washing temperatures. The research results only apply to this type of bio-indicator, the **DES-controller**.

Tests were carried out under controlled small scale laboratory conditions as well as field conditions by using washer extractors and semi-continuous batch washers.

The results show that even low concentrations of disinfectant have effect on the reduction of micro-organisms inside the membrane. Also it is shown that within the time frame of a laundry cycle, full disinfection can be reached with normal concentrations of disinfectant. The results are in compliance with data from testing of end-products for total colony count (Rodac method). From these results can be concluded that the **DES-controller** is a valid method for testing chemical disinfection at low temperatures for commonly used disinfectants.

This poster shows a summary of the results that were obtained.

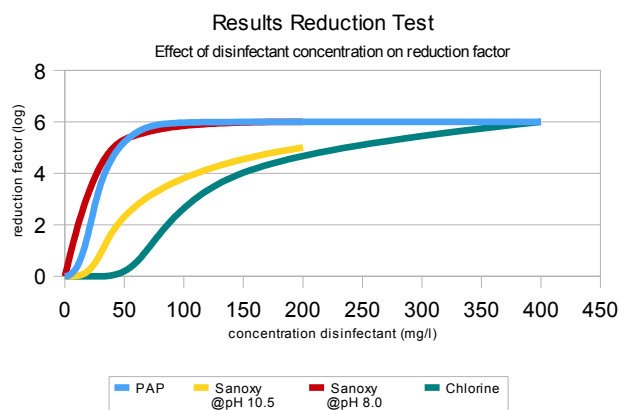
## TEST METHODS AND RESULTS

### Laboratory tests

Small scale laboratory tests were carried out in a Linitest according to ISO-105-C06-A1S with some modifications for temperature and detergent concentration when necessary. Three types of disinfectants were tested at different concentrations: Sodium hypochlorite, PAP/DDPDA and Peracetic acid (Sanoxo). As detergent, the standard ISO-105 ECE detergent was used (4.0 g/l and 1.0 g/l). Disinfectant concentrations were varied during the tests.

**Test conditions:**  
- Time: 15 minutes;  
- Temperature: 40 °C, except Sodium hypochlorite (25 °C);  
- pH-value: 10.5, except Sanoxo test series 2 (8.0);  
- Detergent concentration: 4.0 g/l, except Sanoxo test series 2 (1.0 g/l)

Figure 1 - Summary of the results of the laboratory tests



### Field tests in washer extractors

Field test were performed at 40 °C with heavy soiled care home laundry; with and without disinfectant.

**Test conditions:**  
- Washing machine (load: 8 kg) with heavy soiled care home laundry;  
- Liquid detergent (7.5 ml/kg);  
- Formula with pre-wash and main wash at 40 °C;  
- Disinfection with PAP/DDPDA (7.5 ml/kg).  
- 4 DES-controllers per load were used.

Table 1 - Summary of the results of the field test with washer extractors

No.	Without disinfectant	With disinfectant
Run 1	≤ 10E3	≥ 10E6
Run 2	≤ 10E3	≥ 10E6
Run 3	≤ 10E3	≥ 10E6
Run 4	≤ 10E3	≥ 10E6

### Field tests with semi-continuous batch washers

Two different situations were tested as part of a validation programme:

1. Normally soiled hospital laundry and PAP/DDPDA disinfection at 45 °C;
2. White roll towels, using the same type of process.

**DES-controllers** were used to test the reduction factor. Rodac plates were used for measuring the total colony count of the end product. These measurements were part of a long term measurement programme, the results below are a short summary of the complete test results.

**Results:**

A disinfection factor of 10E6 was measured for all tested situations. The end products were according to the requirements in all situations.

## CONCLUSIONS

- within the time frame of a normal laundry process, **DES-controllers** are able to measure disinfection, even at low temperatures
- the concentrations of disinfectants that were needed to obtain complete reduction (log 6) are in accordance with concentrations normally used in laundry processes
- results obtained with **DES-controllers** are in compliance with results obtained with for instance Rodac plates provided all other hygienic requirements are met