

PUBLICLY AVAILABLE SPECIFICATION

PRE-STANDARD

Clothes washing machines for household use – Method for measuring the
microbial contamination reduction

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CLOTHES WASHING MACHINES FOR HOUSEHOLD USE – METHOD FOR MEASURING THE MICROBIAL CONTAMINATION REDUCTION

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IEC PAS 62958 has been processed by subcommittee 59D: Performance of household and similar electrical laundry appliances, of IEC technical committee 59:

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft PAS	Report on voting
59D/423/PAS	59D/427/RVD

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INTRODUCTION

SC 59D decided to address the measurement of the microbial contamination reduction in washing machines by developing a globally acceptable Publicly Available Specification to respond to the increase in consumer complaints regarding odour from washing machines and washed laundry caused by presence of microorganisms.

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CLOTHES WASHING MACHINES FOR HOUSEHOLD USE – METHOD FOR MEASURING THE MICROBIAL CONTAMINATION REDUCTION

1 Scope

This Publicly Available Specification (PAS) specifies a test method for measuring the reduction of microbial contamination in clothes washing machines and of the possible cross contamination to uncontaminated load.

NOTE A significant differentiation in microorganism contamination reduction capability of washing machines can be expected at wash temperature not higher than 40 °C.

This PAS applies to clothes washing machines for household use, with or without heating devices utilising cold and/or hot water supply. It also covers washing machines which specify the use of no detergent for normal use. This PAS applies also to washing machines for communal use in blocks of flats or in launderettes.

This PAS does not deal with professional washing machines nor with commercial laundry operations associated with food service, hospital linens or other non-residential applications. It also does not address the needs of persons with specific health conditions requiring special sanitization and/or disinfection techniques.

This PAS does not specify safety requirements and does not deal with performance of washing machines measured under IEC 60456 nor with effects on fabrics.

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2 Normative references

IEC 60456:2010, *Clothes washing machines for household use – Methods for measuring the performance*

ISO 2267, *Surface active agents – Evaluation of certain effects of laundering – Methods of preparation and use of unsoiled cotton control cloth*

EN 1276, *Chemical disinfectants and antiseptics. Quantitative suspension test for the evaluation of bactericidal activity of chemical disinfectants and antiseptics used in food, industrial, domestic and institutional areas. Test method and requirements (phase 2, step 1)*

EN 1650, *Chemical disinfectants and antiseptics. Quantitative suspension test for the evaluation of fungicidal or yeasticidal activity of chemical disinfectants and antiseptics used in food, industrial, domestic and institutional areas. Test method and requirements (phase 2, step 1)*

EN 12353, *Chemical disinfectants and antiseptics. Preservation of test organisms used for the determination of bactericidal (including Legionella), mycobactericidal, sporicidal, fungicidal and virucidal (including bacteriophages) activity*

3 Terms, definitions and symbols

3.1 Terms and definitions

3.1.1

washing machine

appliance for cleaning and rinsing of textiles using water which may also have a means of extracting excess water from the textiles

3.1.2

test washing machine

washing machine that is subjected to part or all of the requirements in this PAS in order to determine its performance

3.1.3

test run

single performance assessment

3.1.4

programme

series of **operations** which are pre-defined within the **washing machine** and which are declared by the manufacturer as suitable for washing certain textile types

3.1.5

base load

textile load used for testing not including the **bio monitors**

3.1.6

cross contamination

transfer of microorganisms from fabrics to fabrics during one **test run**

3.1.7

inoculum

quantity of cells to be inoculated in culture medium

3.1.8

bio monitor

microorganism carrier inoculated with microorganisms to be used to monitor the reduction of microbial contamination

3.1.9

temperature profile

time–temperature data representing the water temperature in the **washing machine** during the **test run**

3.2 Symbols

N_0	average value of microorganism amount of the two positive controls, before exposition to the test programme (cfu/bio monitor)
N	average value of microorganism amount per 5 bio monitors , after exposition to the test programme (cfu/bio monitor)
$\log(N_0/N)$	reduction factor per microorganism type
v^{-1}	microorganism amount in a 10 times diluted solution
v^{-2}	microorganism amount in a 100 times diluted solution
SD_{initial}	standard deviation of N_0
SD_{washed}	standard deviation of N

SD_{total} standard deviation of the reduction factor per microorganism type

4 Requirements

This Publicly Available Specification specifies a test method for measuring the reduction of microbial contamination in clothes **washing machines** and of the possible cross contamination in subsequent washed loads.

This PAS does not specify safety requirements and does not deal with performance of **washing machines** measured under IEC 60456 nor with effects on fabrics.

5 Test conditions, materials, equipment and instrumentation

5.1 Test conditions

For all requirements regarding ambient conditions (electricity supply, water supply, ambient temperature and humidity) and **base load**, see IEC 60456:2010.

Additionally, the water supplied to the **test washing machine** shall not contain more than 100 cfu/ml. Microorganisms for test purposes as listed in 5.2.1 shall not be present in the water.

The microbiological quality of the water supplied to the **test washing machine** is determined according to 5.2.3.2 and 6.5.3

5.2 Materials and reagents

5.2.1 Microorganisms for test purposes

For test purposes the following microorganisms, the first two bacteria strains and the last one a yeast strain, shall be used:

- *Pseudomonas putida* (ATCC 11172 / DSM 6521)
- *Staphylococcus aureus* (ATCC 6538 / DSM 799)
- *Candida albicans* (ATCC 10231 / DSM 1386)

NOTE Additional microorganisms may be used. For internal development purpose and pre-evaluation of microorganism contamination reduction in clothes **washing machines**, a protocol with risk class 1 test microorganisms may be performed as described in Annex A.

5.2.2 Culture media and solutions

5.2.2.1 Culture media

All media and solutions shall be of microbiology grade and sterilized appropriately prior to use. It is recommended to use commercially available and/or water-free dry materials for the culture media. The specifications in the following clauses refer to water-free products.

5.2.2.1.1 Tryptone Soy Agar (TSA)

The composition of Tryptone Soy Agar (TSA) shall be according to Table 1.