

Functionality evaluation for Textile products: Antibacterial Test

【Test method for each type】

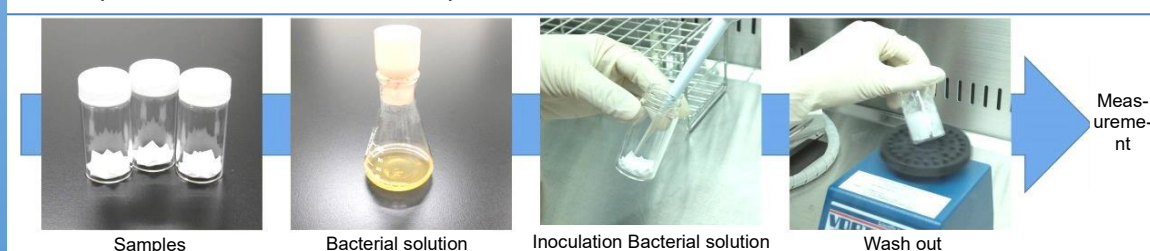
JIS L1902 Bacterial solution absorption method

This is the most common method among the antibacterial tests for textiles and is applied to the testing method for SEK mark of Japan Textile Evaluation Technology Council.

Similar international method: ISO 20743, GB T 20499-2

【Overview】

Inoculate and culture bacterial solution on a test specimen with antibacterial finishes and a control sample (cotton standard cloth) to be compared. After a certain period under the same condition, the number of bacteria or the amount of ATP (intracellular), on the two samples are measured and compared.



1. Pour-plate culture (colony method)

Visually measure the number of bacteria on the colony formed on agar medium

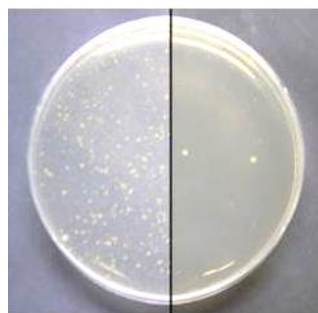


Figure Image
Fungi detected on the scale (colony)
Left: Control sample (Unfinished)
Right: Test sample (Finished)

2. Luminescence measurement (ATP method)

Measure the number of bacteria by the light intensity from chemical luminescence of bacteria energy (ATP)

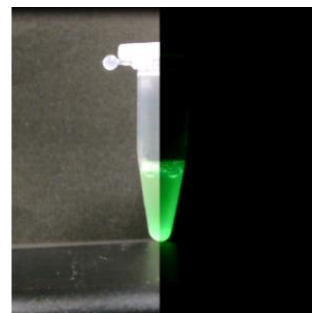


Figure Image
Image of luminescence

【Evaluation / Standard value】

Evaluate with antibacterial activity value [A].

| Calculation formula of activity value | Standard | Type of finishes | Standard value |
|---|----------|---|----------------|
| $\text{Antibacterial activity value [A]} \\ (\text{LogC}_t - \text{LogC}_0) - (\text{LogT}_t - \text{LogT}_0) \\ = F - G$ | JIS | Antibacterial finished | $[A] \geq 2.0$ |
| | SEK | Antibacterial and deodorant finished | $[A] \geq 2.2$ |
| | | Antimicrobial finished for general use | $[A] \geq [F]$ |
| | | Antimicrobial finished for specific use | $[A] > [F]$ |

Contact regarding
antibacterial test

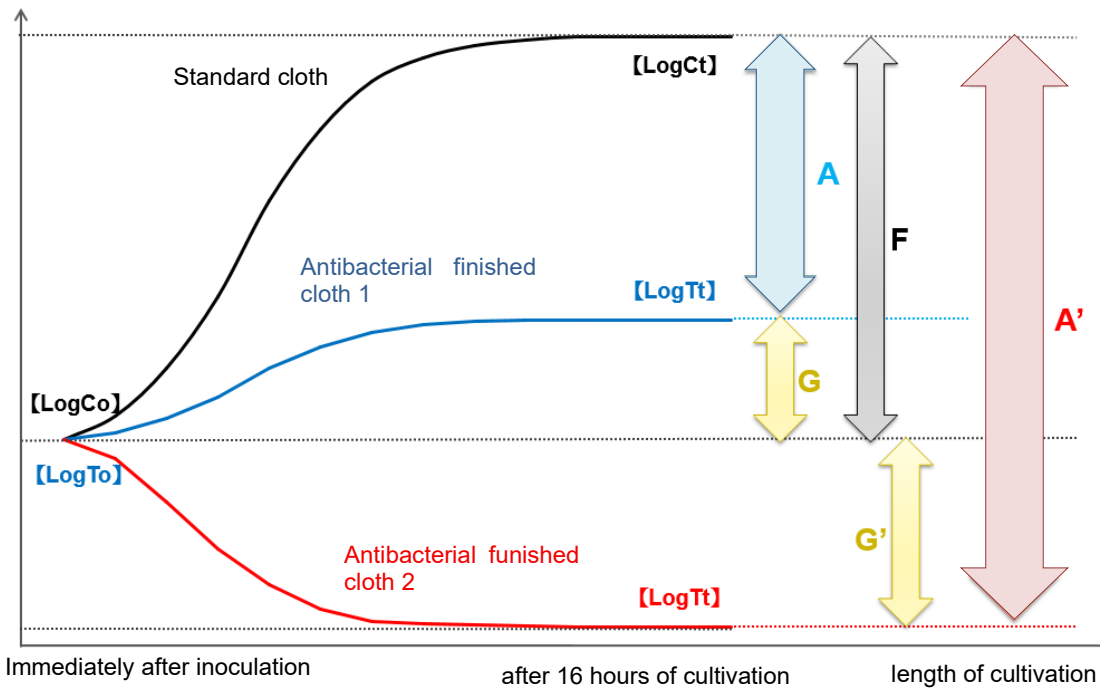
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Number of living bacteria



A : Antibacterial activity value

F : Proliferation of fungi on control sample

G : Proliferation of fungi on finished test sample




LogCo : Common logarithm value of the average of 3 samples immediately after inoculation of the control sample

LogCt : Common logarithm value of the average of 3 samples immediately after cultivation of the control sample

LogTo : Common logarithm value of the average of 3 samples immediately after inoculation of the test sample

LogTt : Common logarithm value of the average of 3 samples immediately after cultivation of the test sample

【Type of bacteria used for tests according to SEK mark】

| Type of bacteria | JIS | Antibacterial finished product  抗菌防臭加工 | Antimicrobial finished product | |
|------------------------|-----|---|--|---|
| | | | General use  制菌加工 | Specific use  制菌加工 |
| Staphylococcus aureus | ○ | ◎ | ◎ | ◎ |
| Klebsiella pneumoniae | ○ | — | ◎ | ◎ |
| MRSA | — | — | — | ◎ |
| Escherichia coli | — | — | ▲ | ▲ |
| Pseudomonas aeruginosa | — | — | ▲ | ▲ |
| Moraxella osloensis | — | — | ▲ | ▲ |

○ : Can be specified optionally according to the usage of the product

◎ : Indispensable bacteria

▲ : Optional bacteria that can be specified as optional test

For “JEC301 SEK mark certification standard for textile products”, in order to evaluate the washing durability of the finishes, the tests will also be conducted on specimens that have been subjected to washing process prescribed in the certification standard.

JIS Z 2801

This test is to measure the antimicrobial activity of non-porous surfaces, such as plastics and metals etc. among products treated with antimicrobial products.

Applied to the testing of SIAA mark standard.

Similar Abroad Standard : ISO 18184

【Overview】

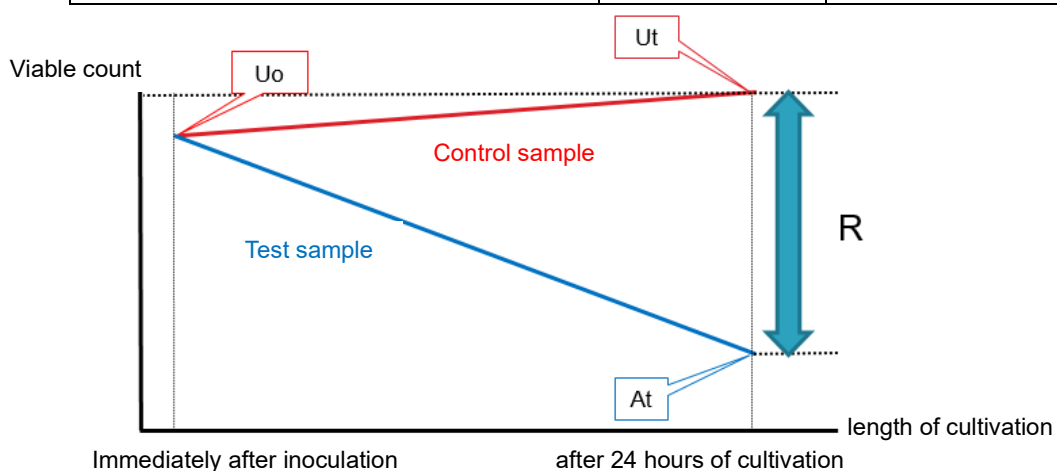
1. Use a plate specimen and inoculate the test solution onto the finished sample and unfinished sample.
2. Be sure that the bacterial solution contacts a certain area evenly, then cover it with a film and oppress.
3. After a certain time of cultivation, the number of bacteria on the sample is measured and compared.
4. The calculation of how much the growth of bacteria was suppressed, is calculated as antibacterial activity value.



【Evaluation / Reference value】

Evaluate according to antibacterial activity value [R]

| Formula for activity value | Standard | Reference value |
|---|----------|-----------------|
| Antibacterial activity value [R] $(U_t - U_o) - (A_t - U_o) = U_t - A_t$ | JIS | [R] ≥ 2.0 |
| | SIAA | |



R : Antibacterial activity value

Uo : Logarithmic value for the viable count of the unfinished test sample immediately after inoculation

Ut : Logarithmic value for the viable count of the unfinished test sample 24 hours after cultivation

At : Logarithmic value for the viable count of the antibacterial finished test sample after 24 hours

【Antibacterial Test】

| Bacteria | JIS regulation | SIAA standard |
|-----------------------|----------------|---------------|
| Staphylococcus aureus | ◎ | ◎ |
| Escherichia coli | ◎ | ◎ |

◎Indispensable bacteria

As we correspond to other non-standardized bacteria tests, please feel free to consult with us.