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Subject Exposure to Sweat and Perspiration for Conducive Yarn	
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Gage R&R: ☐ Complete ☑ In Progress ☐ Available ☐ NO	
Originating Task Group: Conductive Yarns for E-Textiles Test Methods Task Group	

IPC-TM-650
TEST METHODS MANUAL

1 SCOPE

This test method is used for determining the change in one or more functionally relevant parameters in conductive yarn as a result of sweat and perspiration exposure.

2 APPLICABLE DOCUMENTS

2.1 International Organization for Standardization (ISO)[1]

ISO 139 Textiles Standard atmospheres for conditioning and testing

ISO 3696 Water For Analytical Laboratory Use

3 SPECIMENS

3.1 All test specimens **shall** be conditioned for ≥ 24 hours according to ISO 139.

3.2 Each specimen **shall** be ≥ 50 cm [19.68 in].

3.3 The number of specimens **shall** be at least five.

3.4 The specimens **shall** be collected in a manner that will not affect the physical characteristics of the yarn and by using appropriate cutting tool (scissors, wire cutters, etc.).

3.5 A control specimen **shall** be retained for visual inspection comparison.

4 APPARATUS AND MATERIAL

4.1 Pipette or dropper

4.2 Glass rod, with a rounded end

4.3 Protective equipment

4.4 Flat-bottom glass dish large enough to contain specimen

4.5 Alkaline and Acid Solutions

1 www.iso.org

4.5.1 Alkaline solution, freshly prepared, using grade 3 water complying with ISO 3696, containing, per liter:

- 0.5 g of l-histidine monohydrochloride monohydrate ($C_6H_9O_2N_3 \cdot HCl \cdot H_2O$)
- 5 g of sodium chloride (NaCl) and either
  - 5 g of disodium hydrogen orthophosphate dodecahydrate ($Na_2HPO_4 \cdot 12H_2O$)

  or
  - 2.5 g of disodium hydrogen orthophosphate dihydrate ($Na_2HPO_4 \cdot 2H_2O$).

Bring the solution to pH 8 (± 0.2) with 0.1 mol/L sodium hydroxide solution.

4.5.2 Acid solution, freshly prepared, using grade 3 water complying with ISO 3696, containing, per liter:

- 0.5 g of l-histidine monohydrochloride monohydrate ($C_6H_9O_2N_3 \cdot HCl \cdot H_2O$)
- 5 g of sodium chloride (NaCl)
- 2.2 g of sodium dihydrogen orthophosphate dihydrate ($NaH_2PO_4 \cdot 2H_2O$)

Bring the solution to pH 5.5 (± 0.2) with 0.1 mol/L sodium hydroxide solution.

4.6 Grade 3 water

5 PROCEDURE

All testing **shall** be conditioned and performed at standard lab conditions as specified in ISO 139.

5.1 Lay out specimen to be exposed, smoothly in a flat-bottomed dish and cover it with an alkaline solution.

5.2 Thoroughly wet the specimen in this solution at an approximate liquor ratio of 50:1 and allow it to remain in the solution at room temperature for 30 minutes.

5.3 Agitate the specimen intermittently to ensure good and uniform penetration of the liquor.

5.4 Pour off the solution and wipe the excess liquor off the specimen.

5.5 Visually assess the wet specimen after 10 minutes and note any changes.

5.6 Place the specimen on a flat surface and allow it to dry.

5.7 Make note of any visual changes against the control specimen once specimen is dry.

6 TEST REPORT

The report **shall** contain the following information:

- Date and time of test
- Testing location and name of tester
- Test Method number
- Environmental test conditions (if different from ISO 139)
- Number of test specimens
- Description of test specimens
- Description/Specifications of testing equipment
- Testing parameters/specifications if variation is possible (e.g., type of solution used)
- Test results, including average values and standard deviations.
- Visual inspection before and after exposure
- Any deviation from the procedure as specified

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