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Subject Exposure to Acid for Conductive Yarn	
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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 exposure to dilute solutions of organic and mineral acids.

2 APPLICABLE DOCUMENTS

2.1 International Organization for Standardization (ISO)[1]

ISO 139 Textiles - Standard atmospheres for conditioning and testing

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 One or more of the following acids, as specified:

- Acetic acid solution, containing 300 g of glacial acetic acid (CH_3COOH) per L of water
- Sulfuric acid solution, containing 50 g of concentrated sulfuric acid (H_2SO_4) (1.84 g/mL) per L of water
- Tartaric acid solution, containing 100 g of crystalline tartaric acid ($HO_2CCHOHCHOHCO_2H$) per L of water (especially for acetate fibers)
- Hydrochloric acid solution, containing 350 g of concentrated hydrochloric acid (HCl) per L of water

4.6 Grade 3 water

1 www.iso.org

5 PROCEDURE

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

5.1 Select acid (see Table 1).

Table 1 pH Levels of Acid

Acid Solution	pH
Acetic acid	1.8 to 2.4
Tartaric acid	1.5 to1.8
Sulfuric acid	0.6 to 0.8
Hydrochloric acid	0.1 to 0.3

5.2 Place the specimen in a clean, dry, flat-bottomed glass dish.

5.3 Use dropper and glass rod to spread the acid, applying enough to cover the yarn.

5.4 Visually assess the yarn after 10 minutes. Note all changes that occur during and after the exposure to the acid solution.

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

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

5.6 Repeat process for all other acids as specified.

6 TEST REPORT

The test report **shall** include 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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