Standards and regulations for smart textiles

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1. The need for standardization in the field of smart textiles
1.1. Standards – definition, types of technical standards, life cycle of a technical standard
Classification of technical standards

- Level of commitment:
  - Voluntary consensus standards
  - Industry standards
  - Government standards, regulations, directives

- Nature:
  - Normative
  - Informative
  - Standards
  - Technical specifications
  - Technical reports
Structure of a technical standard

Denomination of a standard:
- Initials of the organizations adopting the standard
- Number of the standard, followed by the year when the standard was adopted
- Title of the standard
- Any modifications, amendments

- EN 16812: 2016 Textiles and textile products - Electrically conductive textiles - Determination of the linear electrical resistance of conductive tracks
  Adopted in 2016, not yet modified or amended.
  4 editions, last one in 2021, all included modifications.

- ISO 6330: 2021 Textiles — Domestic washing and drying procedures for textile testing

  Issued in 2016, amended in 2018. Consolidated version - both the original and amended content is included.
1. Scope
2. Normative references
3. Terms and definitions
4. Specifications
5. Sampling
6. Annexes

Content organization

Structure of a technical standard
Life cycle of a technical standard

1. Proposal
2. Drafting
3. Enquiry
4. Publication
5. Periodical review

Standard
• reconfirmed,
• replaced by another version,
• amended or
• withdrawn
1.2. The need for standardization in the field of smart textiles
Advantages of standardization

- R&D of smart textiles
  - Unity in research results
  - Consistent design procedures
  - Consistent testing procedures
  - Sustainable R&D

- Manufacturing smart textiles
  - Accuracy and repetability
  - Production systems
  - Quality assurance

- Trade of smart textiles
  - Communication
  - Conformity
  - Proprietary information
  - Support in litigations

- Product life-cycle, environmental issues, sustainability
  - EU regulations
  - Environmental impact
  - Cradle-to-cradle design
2. Organizations involved in developing standards and regulations for smart textiles
Standards and regulations for smart textiles

International organizations
- Standards valid world wide

Regional organizations
- Standards valid in the EU

National organizations
- Standards valid in EU countries
Standards and regulations for smart textiles

EU standardization network

- CEN
- CENELEC
- ETSI
- EU Commission

Mandates for standardization (approx. 20%)

National standardization bodies

- SIS Swedish Institute for Standards (Sweden)
- ELOT Hellenic Organization for Standardization (Greece)
- ASRO Organismul National de Standardizare (Romania)
- UNI Ente Italiano di Normazione (Italy)
- UNE Asociación Española de Normalización (Spain)
- SIST Slovenian Institute for Standardization (Slovenia)
- DIN Deutsches Institut für Normung e. V. (Germany)
- AFNOR Association française de normalisation (France)
- BSI British Standards Institution (UK)
- ...

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International standardization organizations

- International Standard Office ISO - independent, non-governmental international organization with a membership of 167 national standards organizations, including those from all EU countries
- International Electrotechnical Commission IEC is a non-profit organization that develops and publishes standards concerning electrical technologies, with a network of over 150 countries
- ASTM International (former American Society for Testing and Materials), an organization that develops technical standards for a variety of industrial applications
- Association of American Textile Chemists and Colorists AATCC is a standardization organization that is dedicated exclusively to the textile sector
- IPC is an American non-profit organization for the electronics sector that is developing standards at a global level.
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<td>TC38</td>
<td>WG32 Smart textiles</td>
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<td>IEC</td>
<td>TC 124 Wearable electronic devices and technologies</td>
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Standard harmonization

The process in which standards are aligned by adopting common standards and the redundant ones are eliminated.

The EU directives for a certain domain of use (e.g., PPE, health) contain regulations that must be followed and the requirement to harmonize the existing standards for the respective destination.
the CE marking indicates that a product has been assessed by the manufacturer and deemed to meet EU safety, health and environmental protection requirements

Some products have to certified.
For smart textiles, their use for medical devices and PPE requires certification.

1. EU Requirements (imposed by EU directives)
2. Conformity of the product/s to harmonized standards
3. Product testing
4. Compile technical documentation
5. EU declaration of conformity + CE mark

Conformity assessment bodies (CAB)
CE mark + ID of the CAB
3. Correlation between the end-use requirements and standards for smart textiles
Summary

• Standards and regulations are essential for developing smart textile products, as they impose the norms for the entire value chain, from design to manufacturing to use and to end-of-life.

• The organizations involved in developing standards for smart textiles are national, regional (at EU level -CEN/CENELEC and ETSI) and international (ISO, ASTM, AATCC, IPC).

• An important aspect of regulations concerning certain applications is the need to certify such products. Certification is attested by the CE marking.

• Standards regulate and support the design of smart textiles, the evaluation of their performance, durability, safety, efficiency and their manufacturing.
Partners:

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