Wearables
User Comfort and Evaluation

IEC TC 100 SS 8 Wearable Systems and Equipment
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Project Objectives

- Objectives to improve user comfort of smart textiles and wearables:
  - Research on "skin-friendly" for development of skin comfort requirements
  - Development of heatable/cooling textiles for thermal comfort improvement
  - Development of temperature requirements to avoid over-heating
  - Development of smart textiles for therapy and rehabilitation
    - Smart clothing for the ageing population
  - Development of power supply sources
  - Evaluation of requirements for battery run-time

Rationale

- Materials:
  - Certain metals and synthetic fabrics can contain chemicals that may cause a reaction when in contact with skin, resulting in rashes and allergic reactions
  - Product labels should note if the wearable contains metal e.g. nickel
  - Chemical content assessment required
- Thermal injuries:
  - Microprocessors can produce high operating temperatures
  - Surface temperatures limits to be set for wearables

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Press articles

- http://betanews.com/2015/05/11/safety-is-an-essential-concern-for-the-future-of-wearables/
- http://www.apple.com/support/assets/docs/products/watch/Restricted_Chemicals_for_Wearables.pdf
- http://www.engadget.com/2014/01/14/wearable-skin-sensitivity/
- http://consumerist.com/2014/01/13/fitbit-force-is-an-amazing-device-except-for-my-contact-dermatitis/
- http://www.fitbit.com/de/productcare
- http://www.tuv-sud.com/home-com/resource-centre/publications/e-ssentials-newsletter/mhs-e-ssentials/e-ssentials-march-2015/approval-of-wearables

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Evaluation of Wearables for User Comfort

- Device Weight
- Product and Display Size
- Battery run-time
- Battery charging (how often, how long)
- Instead of charging wearables with some sort of cable, new wearables could produce the energy they need from the light, heat or vibration in their surroundings.
- Washability
- Toxic/chemical elements
- Water resistance
- Mechanical controls, display, speech and general operation controls, audio feedback controls, touch-operated controls

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Applications

- Protective clothing
  - Stress monitoring
  - Comfort measurement
  - Incorporation of GPS and mobile communications
- Medical textiles
  - Remote health monitoring
  - Intelligent mattrasses
- Sports & leasure wear clothing
  - High visibility
  - Active cooling and heating; breathability
  - Monitoring physical performance
- Home & automotive applications
  - Smart carpets for fall detection
  - Intelligent seats

Source: Centexbel, Textile Competence Centre, Belgium

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Proposal

- Develop new work item: user comfort and evaluation of smart textiles and wearables