ETSA requirements for workwear garments

FEBRUARY 2011

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1. What are the ETSA requirements for workwear garments?

- Guidelines which aim to define basic requirements for workwear worn at the workplace to withstand **tough industrial processing over the full lifetime** of the garment.

- Set of requirements on performance levels and recommendations which offer guidance to garment manufacturers, designers and other parties involved in the supply chain.
- Annex B defines ETSA requirements on general–purpose workwear fabrics for bulk business: PES/CO and CO/PES (minimum 30% PES) blends. These fabric requirements are not applicable to 100% cotton or 100% PES fabrics, as different requirements would apply.

2. Why guidelines on workwear garments?

Workwear is exposed to intensive wear and tear and soiling, and therefore needs frequent care and maintenance to ensure that protection, comfort, style, image and hygiene properties continue to be provided over the entire lifetime of the garment.

To do this in a safe and effective way, specialised garments and specialised processing of these garments is vital. With this mind, industrial laundry processes have been developed to meet these needs, while preserving style and appearance so valued by end-users.

The members of ETSA, the European Association of the Textile Services industry, are concerned that garments currently placed on the market are sometimes ill-suited to withstand repeated industrial processing.

In this context, ETSA has drawn up this set of recommendations and requirements to offer guidance to garment manufacturers, designers and other parties involved in the supply chain.

ETSA
EUROPEAN TEXTILE SERVICES ASSOCIATION

3. Benefits

The ultimate purpose of these requirements is to help increase efficiency throughout the supply chain.

ETSA hopes these guidelines will lead to:

- avoiding re-testing the same or similar garments
- reduced chances of unsuitable garments
- garments which perform better and keep their appearance during their life time
- guideline to design industrial laundry-friendly garments.
- lower cost of garments during the life cycle by e.g. avoiding repairs

By fulfilling the requirements set out in this document, the garments will continue to meet the end-users' needs, after repeated use and regular care and maintenance by textile rental companies.

Users of these guidelines should bear in mind that these requirements do not guarantee the overall performance of garments. They merely provide an indication on suitability/fitness of garments for industrial laundering.

These guidelines alert the launderer and user to possible difficulties in processing a garment.

4. Definitions

Workwear:
"A garment specifically designed to be worn in the workplace."

5. Fabric requirements

See ETSA requirements for workwear fabrics in **Annex B**.

These requirements introduce a simple three dot system to differentiate between low, medium and high limitations in expected use.

They aim to alert to possible problems which may affect fabric suitability for garments intended for the industrial laundry process.

6. Accessories – Closing systems

Accessories, in particular stud fasteners, velcro, elastics and zips, should keep functionality and appearance during the expected lifetime of the garment. Testing should be carried out according to ISO 15797 Textiles – Industrial washing and finishing procedures for testing of workwear, and this under different conditions which reflect practice (for example: closing systems: open or closed; emblems: inside or outside).

- All metal accessories should be rust free
- Any plastic accessories, including plastic fittings, should be able to withstand high temperature washing and tunnel finishing
- Labels should remain legible during the entire lifetime of the garment
- Elastic materials should be able to withstand high alkalinity in the washing process

Examples of pros and cons for different closing systems are provided in **Annex A.**

7. Design, assembly and construction (making-up)

Design, assembly and construction can have a significant effect on the appearance and functionality of a workwear garment after washing.

It can also have a major impact on the repairability of a garment, which in turn, affects the garment lifetime.

By complying with these good practices, garments will retain their appearance and performance at an acceptable level throughout their full lifetime.

Examples of good and bad practices for design and construction for example, pocket design and styles, can be found in **Annex C.**

Aspects to be aware of for design and construction include:

- Seams
  - seam puckering
  - seam strength, in particular for load-bearing seams
- Sizes
- Design suitable for tunnel finishing
- Ergonomics
- Repairs
- Adjustments
- Colour fastness
- Pocket design and styles

8. Typical industrial laundry cycle

A garment is washed to make it clean and pleasant to wear, while maintaining its characteristics and functionality.

It is important to distinguish between hygienic and optical cleanliness… i.e. a stain on a garment does not mean it is not clean.

Among the characteristics of the industrial laundry cycle is large scale washing machines, specialised detergents and high-temperature drying in a "tunnel finisher" or tumble drier.

These washing and drying procedures are more exacting than those for domestic washing. All of this requires high-performing and appropriately designed garments.

At right: Flow chart of an example of an industrial laundry cycle (source: FCRA)

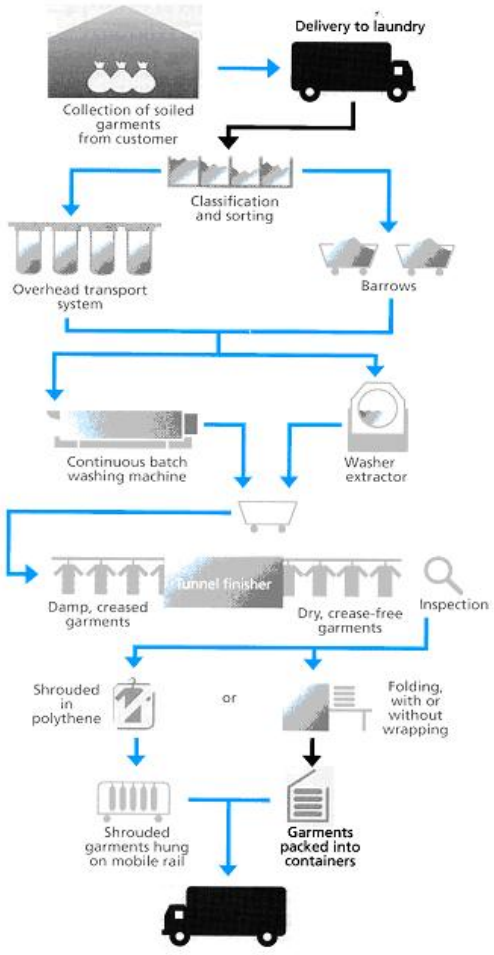


Figure 1 Typical flowline for laundering polyester–cotton workwear.

Annexes

Annex A: Closing systems: examples of pros and cons

Annex B: ETSA requirements for workwear fabrics

Annex C: Design and construction of workwear: examples of good and bad practices

Annex A: Closing systems: examples of pros and cons

Different closing systems are possible for workwear. Some of them are more suited to industrial laundry than others. For example:

- **zips:**
  - the teeth can damage the fabric or other material of the garments while in the washing machine – this can be prevented by closing the zip before washing, thereby reducing labour and costs
  - repairs on zips are in general difficult which makes them expensive

- **buttons:**
  - often need repair (although some types perform better than others)
  - are not mechanically strong enough for heavy duty workwear

- **velcro:**
  - foreign fibres get caught in the hook or loop part which decreases the functionality of the system
  - if not closed, the hook part may damage the garment during the washing process

- **stud fasteners:**
  - stainless steel stud fasteners are the preferred closing system for industrial workwear
  - few repairs needed and when needed easy to carry out
  - when placed on at least 2 layers of material, stud fasteners are a very durable and ergonomic closing system

Annex B: ETSA requirements for workwear fabrics

Workwear Fabrics: Polyester/Cotton - Cotton/Polyester (minimum 30% polyester) 150 g/m² - 400 g/m² intended to be washed industrially (bulk business, no special requirements)

- ••• low limitations in use expected
- •• some limitations in use expected
- • high limitations in use expected

FABRIC DESCRIPTION

BLEND	ISO 1833:1977	max. Tolerance +/- 3 %
TYPE OF BLEND	e.g. homogeneous blend or constructional blend	
SPECIFIC WEIGHT	ISO 3801:1977 Method 5	max. Tolerance for fabrics <230 g/m² +/- 5 % max. Tolerance for fabrics ≥230 g/m² + 5 % /- 4 %
YARN COUNT	ISO 2060:1994 + ISO 2947:1973 in Nm (Ne)	at spinning level
SPINNING PROCESS	e.g. ring or open end	
CONSTRUCTION	ISO 7211-2:1984	
WEAVE	ISO 3572:1976	

PHYSICAL PERFORMANCE

DIMENSIONAL STABILITY ISO 5077:1987 after 5 washes ISO 15797

< 50 % Cotton	•••	max. +/- 2.0 %
	••	max. +/- 3.0 %
	•	> +/- 3.0 %
≥ 50 % Cotton	•••	max. +/- 2.5 %
	••	max. +/- 3.5 %
	•	> +/- 3.5 %

PILLING ISO 12945-2 5,000 rev. after 5 washes ISO 15797 (only for fabrics > 50 % PES)
photographic assessment (EMPA 911 W3 standard) only – fabric to fabric

- ••• Grade 5.0 – 3.5
- •• Grade 3.0 – 2.5
- • Grade 2.0 – 1.0

TENSILE STRENGTH ISO 13934:1999 (Strip Method) warp and weft separate

< 50 % Cotton	⋯	N ÷ g / m² ≥ 2 (N min. 400 N)
	··	400 N – 300 N
	·	less than 300 N
≥ 50 % Cotton	⋯	N ÷ g / m² ≥ 1.8 (N min. 380 N)
	··	380 N – 300 N
	·	less than 300 N

CREASE RECOVERY ISO 15487:2010 (Appearance Method AATCC No 124:1973) after 3 washes
ISO 15797 – The use of tunnel finisher for visual assessment is recommended

< 50 % Cotton	•••	Tunnel	≥ Grade SA 3.5	Tumbler	≥ Grade SA 3.5
≥ 50 % Cotton	•••	Tunnel	> Grade SA 3.0	Tumbler	≥ Grade SA 3.0

ABRASION Current test methods on abrasion are not sufficiently reproduceable (due to variations in sandpaper). Therefore ETSA Workwear WG1 will draw up alternative test methods and performance requirements.

Annex B continued

COLOUR PERFORMANCE

(Colour performance tests on new unwashed fabric only)

COLOUR FASTNESS TO LAUNDERING

ISO 105 C06 E2S Multifibre

Staining Cotton and PES

- ••• Grade 4.5 minimum
- •• Grade 4.0
- • Grade 3.5 and less

Colour Change

- ••• Grade 4.0 minimum
- • Grade 3.5 and less

COLOUR FASTNESS TO BLEACHING:HYPOCHLORITE

ISO 105 N01:1993

- ••• Grade 4.0 minimum
- •• Grade 3.5
- • Grade 3.0 and less

COLOUR FASTNESS TO WATER

ISO 105 E01:1994

- ••• Grade 4.5 minimum
- • Grade 4.0 and less

COLOUR FASTNESS TO ARTIFICIAL LIGHT: XENON ARC FADING LAMP TEST

ISO 105 B02:1994

- ••• Grade 5.0 minimum
- •• Grade 4.5
- • Grade 4.0 and less

COMBINED DRYHEAT- WASHINGFASTNESS

Fixotest 5 min 190° C + ISO 105 C10 Procedure E:2007

Staining Cotton and PES

- ••• Grade 4.5 minimum
- •• Grade 4.0
- • Grade 3.5 and less

Colour Change

- ••• Grade 4.0 minimum
- • Grade 3.5 and less

(ETSA WG1 will carry out tests in order to propose alternative test methods and performance requirements. Until then, this remains an ETSA recommendation).

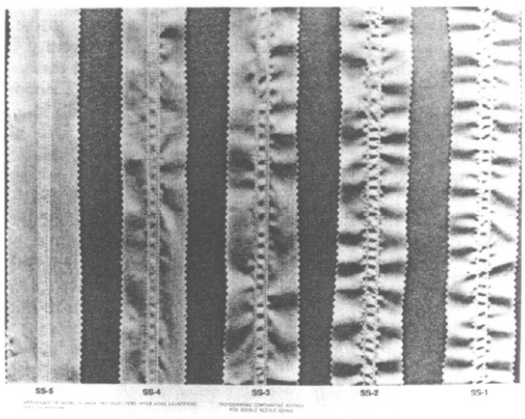
GENERAL ITEMS

- 1. Fabric should be fit for industrial washing and drying as defined in ISO 15797. ISO 30023 defines symbols for testing suitability of workwear for industrial laundry (washing and drying procedures defined in ISO 15797).
- 2. Any further limitation to these performance levels must be clearly indicated.
- 3. When selecting colours, the garment manufacturer should give preference to polyester dyed with disperse dyestuffs and cotton dyed with vat dyestuffs - in accordance with best practice.
- 4. The use of different types of dyestuffs with inferior fastness for adjustment of colour is not recommended.
- 5. For white fabrics, colour change due to chlorine retention should be avoided.
- 6. In terms of harmful substances, the fabric should be in accordance with the Oeko Tex Standard 100.
- 7. Fabric specifications should include a grading system for defects.
- 8. In case of sensitive and/or critical colour combinations in a garment, separate assessment is needed.

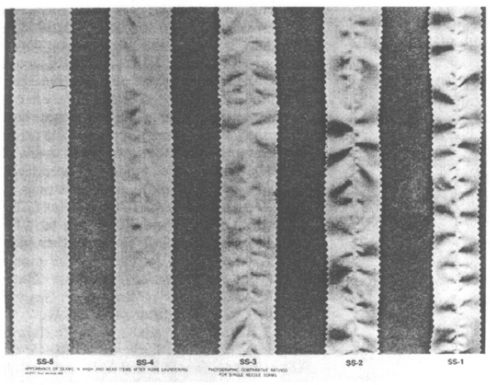
Annex C: Design, assembly and construction of workwear: examples of good and bad practices

- **Seam strength:** should not be adversely affected by industrial laundering, in particular for load-bearing seams.

- **Seam appearance:** propensity to seam puckering should be tested according to ISO 15797 Textiles – Industrial washing and finishing procedures for testing of workwear, in conjunction with photographic displays contained in ISO 15487 which refers to AATCC 88B (see below). The general practice is that seam puckering should not be degraded by more that 1 grade after 3 washes (visual assessment).



B. For double needle seams.



A. For single needle seams.

- **Size designation:** appropriate systems include, for example, EN 13402, intex sizing system or any other appropriate national systems. Consistency of sizing is very important .

- **Design suitable for tunnel finishing:** some details will make it harder or easier to have an acceptable appearance after finishing in a tunnel finisher. For example:

  - place studs as far as possible in the corners: this prevents the corner from folding back (see figure 4)
  - the return of a collar or closure of e.g. a jacket needs to be bar-tacked to prevent the return to fold open
  - avoid multi layers of fabric since this will provoke differences in drying time. Different fabrics may be considered where multi layers are inevitable (e.g. pocket lining).

- **Ergonomics**: the comfort and well-being of the wearer will depend on the design of the workwear.

- **Repairs:** workwear should be designed to make repairs as easy as possible to carry out (see figures 1 to 4).

- **Adjustments**: the design and construction of the garment should take into account the possibility to make adjustments to the garment, e.g. shorten the trouser legs. Adjustable cuffs help a garment to fit a larger range of wearers.

- **Colour fastness**: Should a garment comprise more than one colour, colours should be able to be washed together. For indications on appropriate colourfastness, see Annex B (ETSA requirements for fabrics).

- **Pocket design and styles** (see figures 2 and 4)
  - Is the size appropriate for the actual use?
  - Can they be closed and does the closure prevent objects to fall out of the pocket?
  - Can the pocket be reached easily (e.g. inner pockets)?

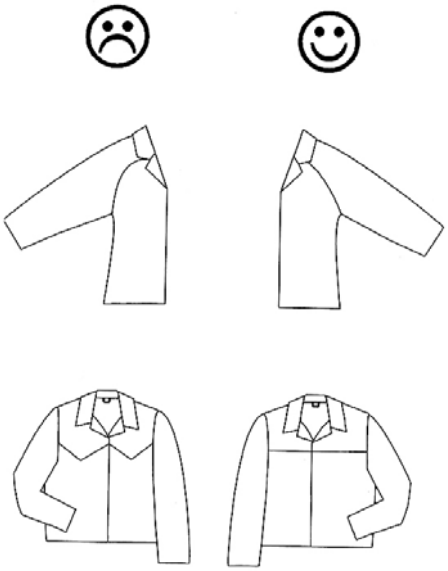


Figure 1 - Straight seams give less problems

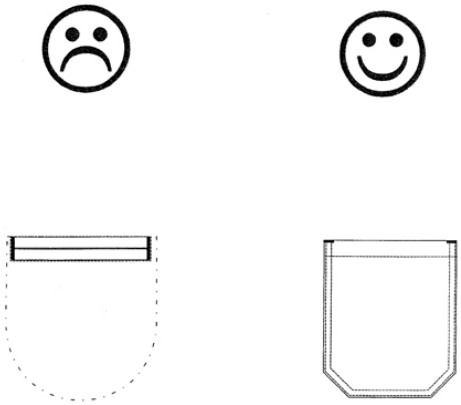


Figure 2

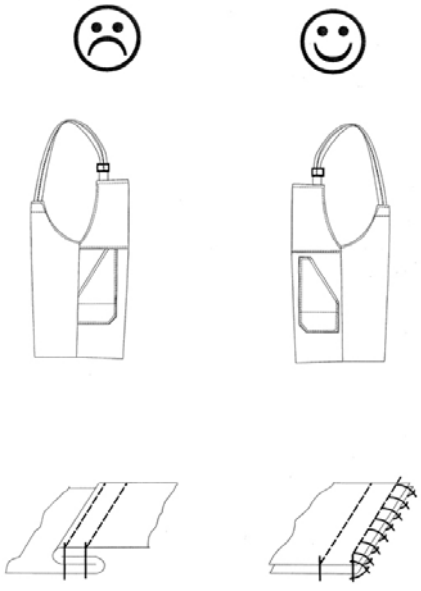


Figure 3

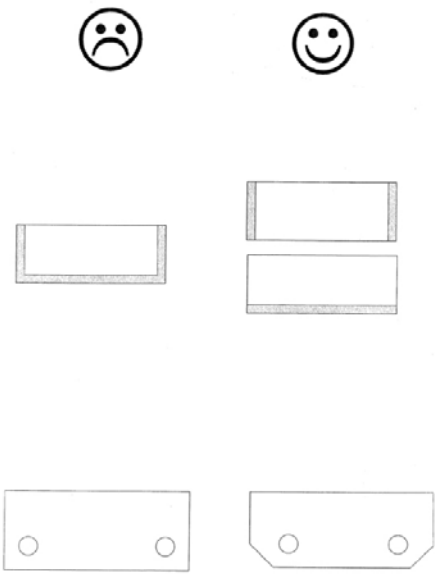


Figure 4

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