Easy-care machine washable wool-polyester suits

Performance and processes

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Background

Why the trend to easy-care?

- Lifestyle changes
- Environmental concerns
- Lightweight fabrics
- Wrinkle-free cotton

Machine washable suits

Wash garments in bag. Drip dry. Minimum iron.

After laundering:

- no shrinkage or damage
- no fuzzing or pilling
- flat seams without pucker
- shape retention
- smooth appearance, no wrinkles
- wool handle and drape maintained.

Easy-care requirements

After ~20 (wool) domestic machine wash cycles or accelerated wash testing - Wascator 3 x 5A cycle

Woolmark W1 and other Woolmark standards:

- Total linear shrinkage less than 3%
- Differential cuff edge felting less than 1%
- Smooth dry (fabric smoothness) rating: > 4
- Crease rating after drying: > 4
- Open seam without pucker
- Surface fuzz formation < 0.3 mm (SiroFAST)

Woolmark www.wool.com

Fabric selection

Ideally around 60% wool, 40% polyester

Objectively measure fabric properties:

- e.g. SiroFAST, provides information on fabric dimensional stability, tailorability (e.g. propensity to pucker)

Determine wash performance:

- e.g. shrinkage, fabric smoothness, surface appearance (fuzz)

Determine setability:

- level of permanent set that can be obtained

Fabric properties critical for tailoring

Physical
- Weight
- Thickness

Dimensional
- Relaxation shrinkage
- Hygral expansion

Mechanical
- Extensibility
- Bending
- Shear

Pressing performance

SiroFAST fabric objective measurement

Fabric manufacture

- Fabric development (good garment making)
- Comparison of new product with existing or competitive products
- Designing fabrics to customer requirements

Finishing

- Understanding the effect of individual finishing operations
- Avoiding the production of problem fabrics
- Correction of problem fabrics / problem solving
- Optimisation of individual processes and process sequence
- Ascertaining the relevance of current practice
- Evaluation of new or alternative technologies
- Engineering special finishes / engineering to customer requirements
- Routine quality control

Garment maker

- Buying control / quality control / comparison of bulk sample and bulk deliveries
- Product development
- Garment costing
- Modifications of operations to handle difficult fabrics / problem solving

SiroFAST

SiroFAST-1	Compression meter
SiroFAST-2	Bending meter
SiroFAST-3	Extension meter
SiroFAST-4	Dimensional stability test
SiroFAST Press Test	Pressing performance

Properties measured using SiroFAST

Fabric weight

SiroFAST-1

- Thickness
- Surface thickness
- Relaxed thickness
- Relaxed surface thickness

SiroFAST-2

- Bending length

SiroFAST-3

- Extensibility at three loads (warp and weft)
- Bias extensibility

SiroFAST-4

- Relaxation shrinkage
- Hygral expansion

SiroFAST Press Test

- Press test angle

Properties calculated using SiroFAST measurements

Bending rigidity
- from bending length and weight

Shear rigidity
- from bias extensibility

Formability
- from bending length, weight and extensibility

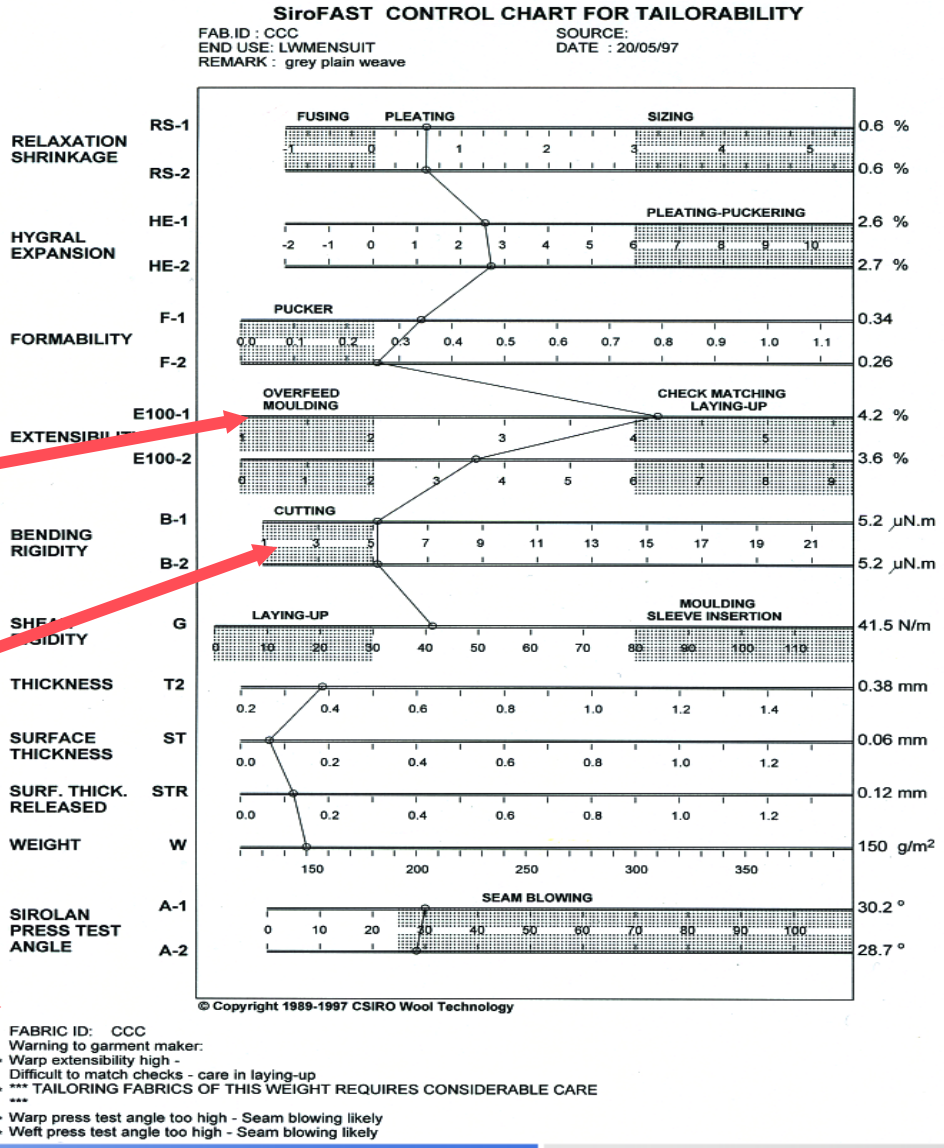
Finish stability
- from surface thickness before and after relaxation

SiroFAST fingerprint

Shaded zones indicate potential problems

Shaded zones depend on proposed end use

Preliminary interpretation given by SiroFAST software



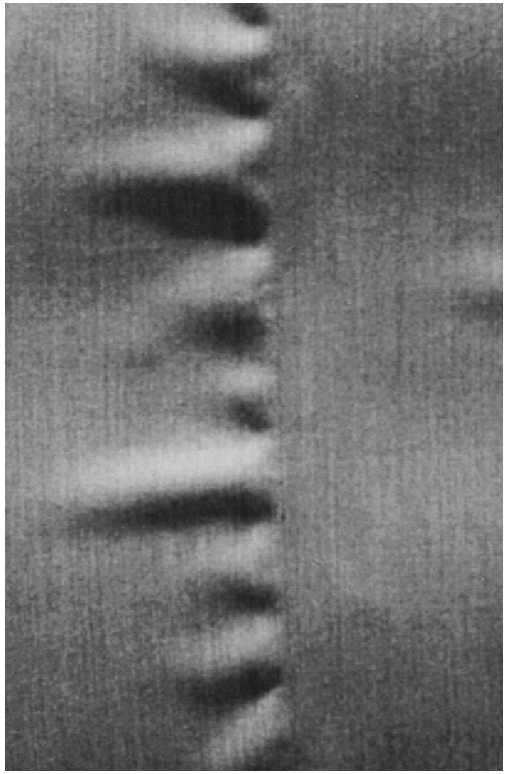
Relaxation shrinkage

Inadequate:

- Panel growth in garment making
- Panel pucker
- Seam pucker
- Puckering of pleats

Excessive:

- Shrinkage of panels in garment making
- Poor pattern matching



Fabric extensibility

Inadequate:

- Harsher handle
- Impaired intrinsic shrink resistance
- Difficult to stretch during seam overfeeding
- Difficult to create sleeve head fullness
- Contributes to low formability (seam pucker)

Excessive:

- Introduction of relaxation shrinkage
- Easily stretched during laying up
- Difficult to cut

Factors in seam pucker

- Feeding mechanism
- Sewing threads
- Moisture
- Inherent pucker (fabric properties)

Formability

Tendency of fabric to buckle when subjected to in-plane compression

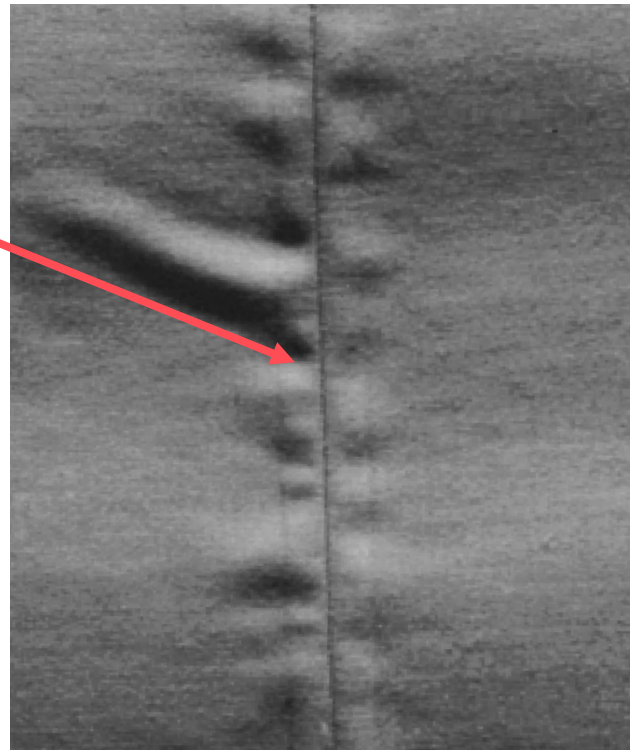
Inadequate:

- Seam pucker
- Poor overall appearance
- Lightweight fabrics

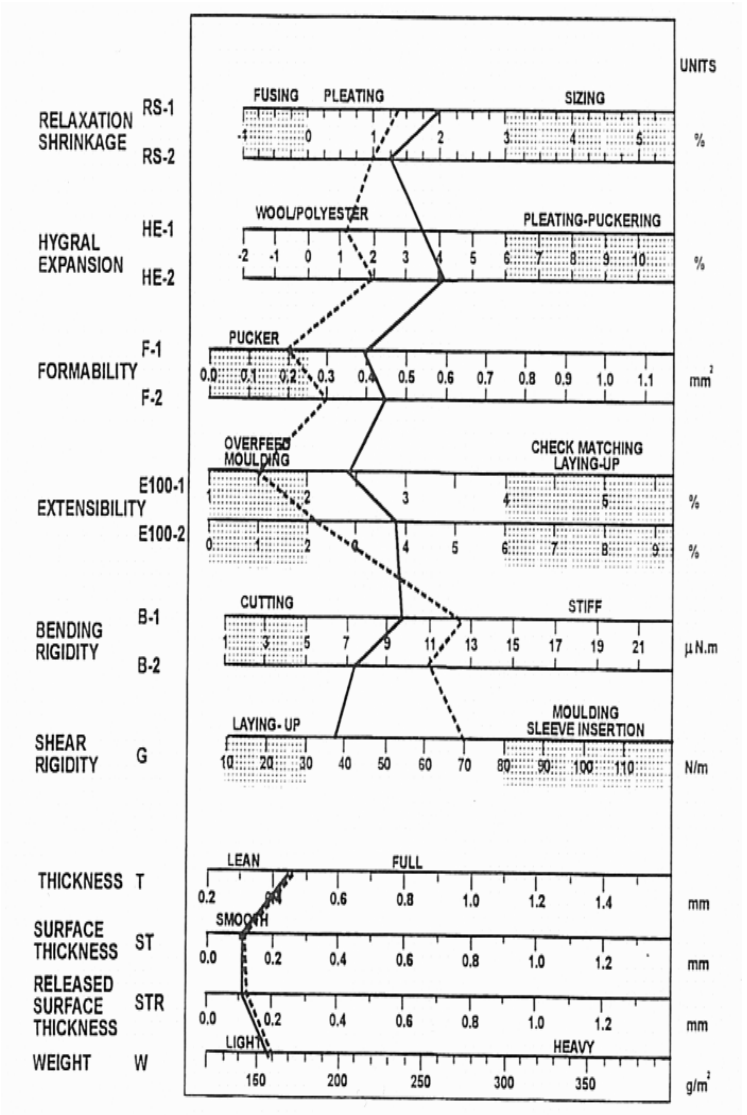
Excessive:

- no problem

$$F = \frac{BR * (E_{20}-E_5)}{14.7}$$



Fabric control chart



Finish stability

Inadequate:

- Re-emergence of latent distortions in fabric

Excessive:

- No problem

$$FS = \frac{ST * 100}{STR}$$

Critical areas in finishing

Heat set at 180°C:

- stabilises fabric before dyeing
- improves smooth drying of colour woven

Maintain extensibility during any setting operation:

- improves comfort/handle
- improves intrinsic shrink resistance
- improves fabric formability (minimises seam pucker)

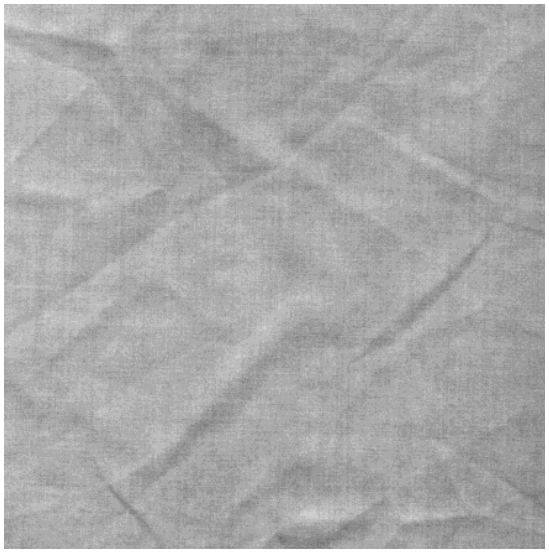
Pressure decatise to complete finishing:

- pH 6-8 and regain of 12-16% for wool component

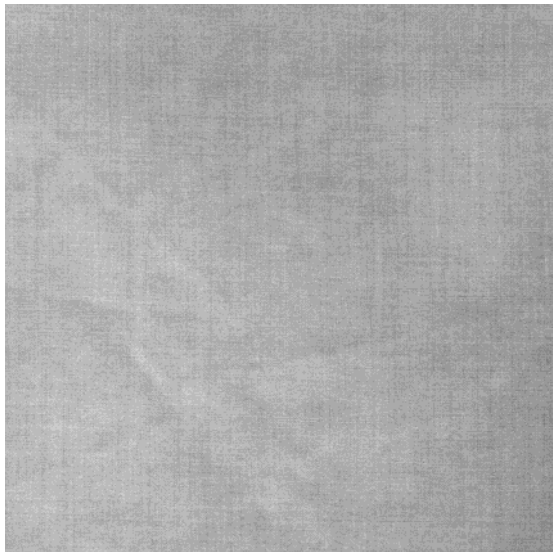
Fabric selection – wash performance

Property	Test Method	Pass Level
Total Dimensional Change		
% shrinkage (width: maximum)	Woolmark TM31	-3
% shrinkage (length: maximum)	Woolmark TM31	-3
% shrinkage (differential cuff edge: maximum)	Woolmark TM31	-1
No. and type of wash cycles	3 x 5A	
Afterwash Appearance		
Fabric Smoothness (Grade: minimum)	Woolmark TM31/281	4
Seam Smoothness (Grade: minimum)	Woolmark TM31/281	4
Laundered Surface Thickness (fuzz) Increase	SiroFAST FAST-1	<0.3 mm
No. and type of wash cycles	3 x 5A	

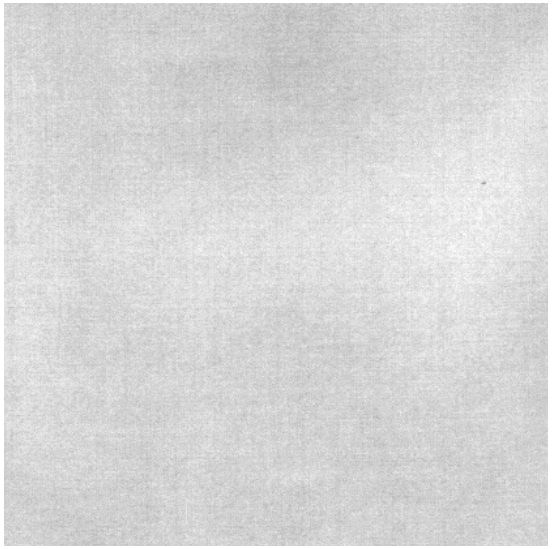
Smooth dry performance of wool-polyester fabrics



Rating 3



Rating 4

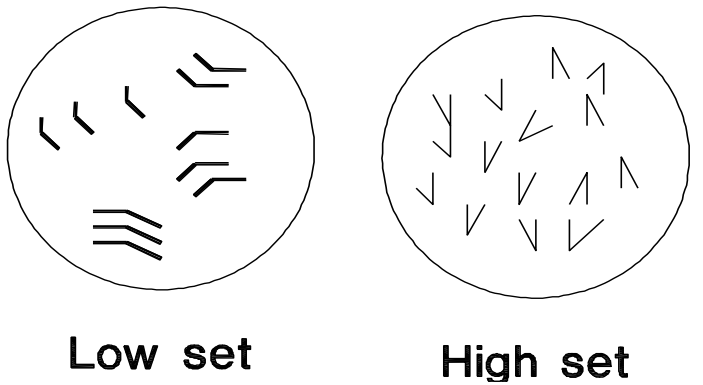


Rating 5

Fabric selection

Permanent set – yarn snippet method

- Steam press (10s steam / 10s bake / 10s vacuum) fabric fold
- Extract 10, 5 mm of yarn snippets
- Relax in water (50°C for 30 minutes)
- Measure angle
- Permanent set (%) = (180 - α)/1.8
- Ideally >40%, preferably >50%



Garment accessories

Fusible interlinings:	Fuse onto stable base. Follow manufacturer's recommendations for time and temperature, e.g. 10s at 160°C
Lining materials:	Polyester generally stable
Sewing threads:	Core spun polyester
Buttons:	Solid coloured
Zippers:	Avoid metal
Wash test:	Shrinkage, delamination, colour change, smoothness, skewing etc

Garment accessories

Accessory	Property	Test Method	Pass Level
Lining Chest Canvas Under Collar	**Relaxation** % shrinkage (width: maximum) % shrinkage (length: maximum) No. and type of wash cycles	 Woolmark TM31 Woolmark TM31 1 x 7A	 -3 -3
Lining Chest Felt Chest Canvas Under Collar	**Total Dimensional Change** % shrinkage (width: maximum) % shrinkage (length: maximum) No. and type of wash cycles	 Woolmark TM31 Woolmark TM31 3 x 5A	 -3 -3
Lining	Smoothness (Grade: minimum) No. and type of wash cycles	Woolmark TM281 3x5A	4
Lining Chest Felt Chest Canvas Under Collar Shoulder Pads	**Afterwash Appearance** No. and type of wash cycles	Woolmark TM31 3x5A	No skewing, rolling, creasing, pilling or shedding.
Fusible Interlining	**Afterwash Appearance** No. and type of wash cycles	Woolmark TM31 3x5A	No delamination or bubbling

Garment making

Pattern adjustment
- Jacket back seam 20 mm, trousers 15 mm - aids seam stability
- Avoid fancy designs and fashion devices until experience gained

Overlock
- Overlock and reverse lock stitch all fabric panels and accessories – prevent entanglement

Fusible
- Follow manufacturer's recommendations for time and temperature, e.g. 10s at 160°C
- Avoid steam without pressure
- E.g. Open press or iron on fused regions (delamination)

Sewing
- Tension and stitch to minimise pucker
- Lapel edge prone to pucker – three-thread chain stitch
- Correct pucker, poor seam formation or fabric distortions by re-sewing

Pressing
- Pressing used to permanently set creases and seams (10 s steam, 10 s bake)
- Pucker cannot be disguised by pressing, particularly around sleeve head
- Leave trousers without hem
- Once pressed, faults will be difficult to remove

Garment – wash performance

Property	Test Method	Pass Level
Tailored Garment Fault Inspection		
As Produced	Woolmark TM288	All Criteria
After Laundering	Woolmark TM288	All Criteria
No. and type of wash cycles	3 x (5A +Air Dry)	
Total Dimensional Change		
% shrinkage (width: maximum)	Woolmark TM31	-3
% shrinkage (length: maximum)	Woolmark TM31	-3
% shrinkage (differential cuff edge: maximum)	Woolmark TM31	-1
No. and type of wash cycles	3 x (5A + Air Dry)	
Afterwash Appearance		
Fabric Smoothness (Grade: minimum)	Woolmark TM31/281	4
Seam Smoothness (Grade: minimum)	Woolmark TM31/281	4
Crease Retention Rating	Woolmark TM31/281	4
No. and type of wash cycles	3 x (5A + Air Dry)	

Summary

Processes and procedures described for easy-care lightweight wool-polyester blend garments targeting:

Machine washable suits

Wash garments in bag. Drip dry. Minimum iron.