PROBLEMS AND SOLUTIONS OF SCIENTIFIC AND INNOVATIVE RESEARCH
Volume 03, Issue 6, 2026

DETERMINING EASE ALLOWANCES IN MEN'S JACKETS USING DIFFERENT PATTERN-MAKING METHODS

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Abstract: This article examines the determination and distribution of ease allowances in men's jacket pattern making using the M. Müller & Sohn, TsNIISHP, SOTShL and EMKO SEV methods. It explores the relationships among chest circumference, back and front panel widths, armhole width and shoulder parameters. The influence of the thickness, elasticity and extensibility of wool suiting fabrics, as well as dimensional changes during steam-and-heat treatment, on garment shaping is also discussed.

Keywords: men's jacket, pattern-making methods, ease allowance, wool fabrics, chest line, armhole–sleeve system, elasticity, extensibility, shrinkage, shape formation.

Introduction. In the garment industry, the quality of men's jackets depends not only on the accuracy of the pattern draft but also directly on the physical, mechanical and technological properties of the selected materials. In particular, for tailored garments made from suiting fabrics, it is important to ensure balance between the human body and the garment, maintain freedom of movement and achieve the desired appearance [6].

When designing a men's jacket, the ease allowance is a construction parameter that ensures the garment fits loosely in relation to the body surface. This allowance must be coordinated not only around the chest but also across the back, front, armhole, shoulder and sleeve areas [1].

Winifred Aldrich's practical guide to menswear pattern cutting also emphasizes the relationship between measurements, materials and construction solutions in garment pattern development [1].

The following factors are of primary importance in determining the amount of garment ease:

- anthropometric measurements of the human body;
- the selected garment silhouette and model features;
- fabric thickness and surface density;
- extensibility in the warp and weft directions;
- the fabric's elastic recovery;
- shrinkage during steam-and-heat treatment;
- the properties of interlining, canvas and lining layers.

Therefore, when men's jackets of the same size are designed using different pattern-making methods, differences arise in the amount and distribution of ease allowances.

Main part.

1. The importance of ease allowances in men's jackets

An ease allowance represents the additional volume of a garment relative to the body measurements. It determines the garment's appearance, fit and wearing comfort [1].

The total ease allowance along the chest line is expressed as follows:

$П_г = П_{back} + П_{armhole} + П_{front}$

where:

$П_г$ – total ease allowance along the chest line;

$П_{back}$ – allowance added to the back panel;

$П_{armhole}$ – allowance added in the armhole area;

$П_{front}$ – allowance added to the front panel.

The distribution of ease allowances depends on the garment silhouette and material properties [1; 4].

For example, relatively smaller allowances are used in semi-fitted jackets to define the body shape more clearly, whereas larger allowances are used in straight-cut jackets to ensure freedom of movement.

2. Effect of material properties on ease allowances

The physical and mechanical properties of suiting fabrics are important in the pattern-making process. Wool fabrics, in particular, are distinguished by their natural elasticity, moisture absorption capacity and ability to take shape during steam-and-heat treatment. The elasticity and shape-recovery properties of wool fibres affect the way the material can be shaped during garment manufacturing [2].

The effect of material properties on garment construction is presented in Table 1.

Table 1.

Properties of suiting fabrics and their effects on garment construction

Fabric property	Effect on garment construction
Thickness	Affects the volume and fit of garment layers
Elasticity	Determines the ability to return to the original state after deformation
Extensibility	Affects garment deformation during movement
Flexibility	Affects the garment's ability to conform to the body shape
Shrinkage	Causes changes in the dimensions of the finished garment
Shape retention	Helps preserve the garment's appearance during wear

Changes in the dimensions of wool materials under the influence of moisture and temperature have also been reported in scientific studies. In particular, the study by Zhou et al. examined dimensional changes in wool fabrics depending on moisture, temperature and processing conditions [3].

Therefore, pattern making should take into account not only body measurements but also the behaviour of the material during technological processing [2; 3; 7].

The shrinkage of a material is determined using the following formula:

$$K = (L0 - L1) / L0 \times 100\%$$

where:

K – material shrinkage, %;

L0 – length before processing;

L1 – length after processing.

Shrinkage values in the warp and weft directions should be determined separately.

3. Determining ease allowances using different pattern-making methods

The M. Müller & Sohn, TsNIISHP, SOTShL and EMKO SEV methods are used in men's jacket design. These methods differ in their approaches to developing construction drafts, taking body measurements into account and distributing allowances, as summarized in Table 2 [4].

Table 2.

Comparative characteristics of men's jacket pattern-making methods

Pattern-making method	Main characteristic	Determination of ease allowance
M. Müller & Sohn	Pattern drafting based on anthropometric measurements and construction widths	Through the widths of the back, armhole and front
TsNIISHP	System of calculated construction parameters and allowances	Based on specified calculation relationships
SOTShL	Use of construction lines and an allowance system	According to the silhouette and garment type

EMKO SEV	Design based on the principles of a unified pattern-making system	Through size designations and construction parameters

The modern M. Müller & Sohn guide developed for men's jackets discusses basic patterns and the distribution of allowances for classic, sport and slim-fit silhouettes [4].

In the TsNIISHP method, the allowance along the chest line is determined through the relationships among several construction measurements and parameters.

Importantly, the differences between the methods are reflected not only in the total amount of ease but also in its distribution among the back, front and armhole sections.

4. Practical calculation using the M. Müller & Sohn method

In the M. Müller & Sohn method, the total allowance along the chest line can be calculated from the combined widths of the back panel, armhole and front panel.

The calculation is expressed as follows:

Пг = Шс + Шпр + Шг − Ог/2

where:

Шс – back panel width;

Шпр – armhole width;

Шг – front panel width;

Ог – chest circumference;

Пг – allowance along the chest line.

Example of a practical calculation:

Given:

Шс = 20 cm

Шпр = 12 cm

Шг = 21 cm

Ог/2 = 48 cm

Calculation:

Пг = 20 + 12 + 21 − 48

Пг = 5 cm

Thus, for the measurements given, the total allowance along the chest line is 5 cm.

5. Distribution of ease allowances according to silhouette

In men's jackets, the amount of ease along the chest line is determined according to the garment's appearance and conditions of use, as shown in Table 3.

Table 3.

Recommended ease allowances along the chest line for different men's jacket silhouettes

Silhouette type	Ease allowance
Slim fit – close-fitting	5.5–6.5 cm
Standard – classic	6.5–8.0 cm
Loose fit	8.0–9.5 cm

Note: These values are presented as preliminary construction recommendations. They should be validated against an appropriate source or experimental results for the specific method, measurement system, material and model.

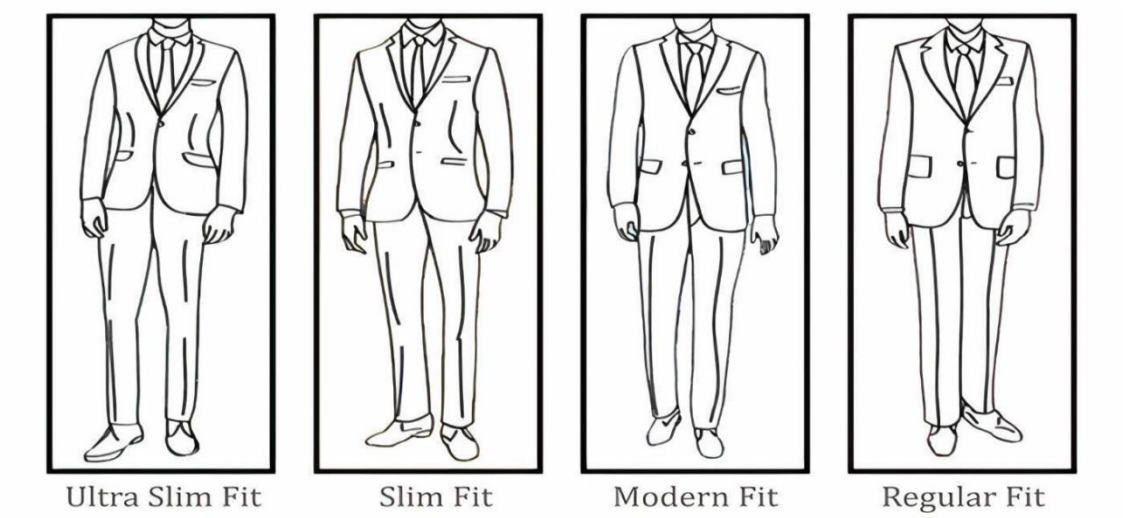


Figure 1. Effect of the ease level on the appearance of men's jackets with different silhouettes.

As shown in the figure, a change in silhouette also changes the garment's position relative to the body surface and its volumetric shape. Therefore, when selecting an ease allowance, not only its total amount but also its distribution among the construction sections should be taken into account.

6. Comparison of allowances in the back, front and armhole areas

Because suiting materials differ in composition and physical and mechanical properties, construction allowances may also vary even for the same silhouette. Based on the values presented in the initial source, the comparison in Table 4 can be provided.

Table 4.

Ease allowances in men's jackets by material and silhouette (cm)

Material type	Semi-fitted: back	Semi-fitted: front	Straight cut: back	Straight cut: front
Cotton fabric	1.7–2.0	1.4–1.6	2.5–3.0	2.0–2.4
Wool fabric	1.0–1.7	1.0–1.5	2.0–2.5	1.5–2.0

Knitted fabric	1.0–1.5	0.8–1.3	1.5–2.0	1.0–1.6

The values in the table show that the amount of allowance varies depending on the material type and silhouette. However, the thickness, elasticity, fibre composition and finishing properties of wool fabrics should also be considered.

7. Relationship between ease allowances and the armhole–sleeve system

The armhole–sleeve system is one of the important construction elements determining the fit quality of a men's jacket. If the allowance along the chest line is distributed incorrectly, the balance between armhole depth, armhole width and sleeve-cap shape may be disrupted [1; 4].

For example:

- insufficient back-panel width causes tightness around the shoulder blades;
- insufficient front-panel width may cause pulling and horizontal wrinkles in the chest area;
- incorrect selection of armhole width restricts arm movement;
- a sleeve cap that does not match the armhole length may create excess folds at the sleeve head.

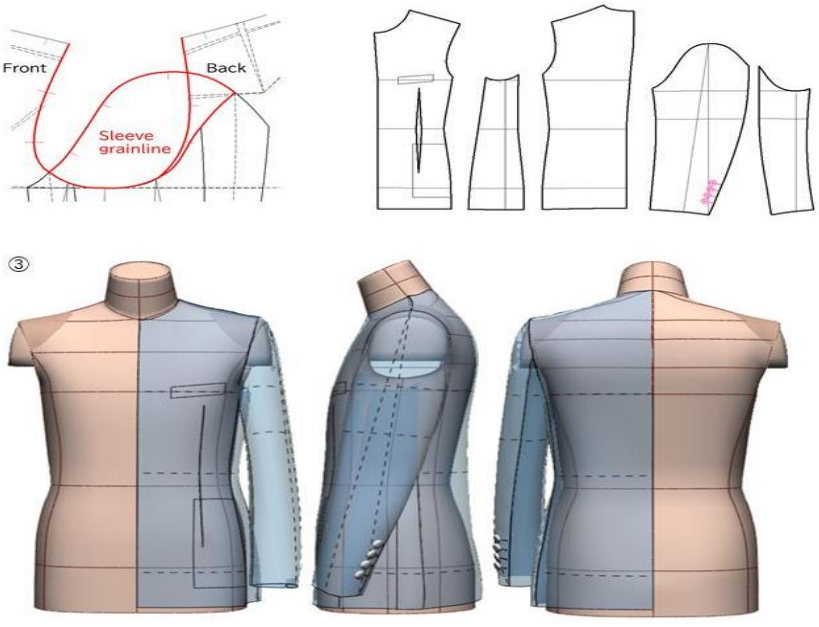


Figure 2. Construction components of the armhole–sleeve system in a men's jacket.

Therefore, when determining ease allowances, the geometric parameters of the armhole–sleeve system must be considered together with the measurements along the chest line.

8. Effect of technological properties and steam-and-heat treatment

In men's jacket manufacturing, the technological properties of the material play an important role in selecting construction parameters. In particular, the required three-dimensional shape is formed through the plastic deformation of wool fabrics during steam-and-heat treatment [2; 3].

Steam-and-heat treatment is used to shape the following garment sections:

1. adding volume to the chest area of the front panel;
2. forming a raised shape in the shoulder area to match the body contour;
3. controlling excess volume in the shoulder-blade area of the back panel;
4. shaping the neckline and shoulder seams;
5. ensuring balance between the front and back sections of the jacket.

Dimensional changes may occur in wool fabrics under the influence of moisture, temperature and pressure. Such changes also depend on the fibre composition, weave structure and previous finishing processes [3; 7]. Therefore, the technological shrinkage allowance should be considered separately when developing the pattern:

Птех = f(Kt, Ka)

where:

Птех – calculated adjustment associated with technological shrinkage;

Kt – shrinkage in the warp direction;

Ka – shrinkage in the weft direction.

This expression indicates a functional relationship; it is not an exact calculation formula. In practical calculations, shrinkage should be determined separately for each construction dimension.

9. Joint assessment of construction and material properties

When determining ease allowances, it is advisable not to rely solely on the pattern-making method but also to take the physical and mechanical properties of the material into account [1; 2; 3].

For this purpose, the following material characteristics are examined:

- thickness;
- surface density;
- extensibility in the warp and weft directions;
- elastic recovery;
- bending properties;
- abrasion resistance;
- shrinkage during steam-and-heat treatment.

When evaluating material properties, measurement results should be determined in accordance with the relevant standards. For example, the international standard ISO 8559-1:2017 may be used to define anthropometric measurements of the human body (Table 5).

Table 5.

Sequence for considering material properties in the pattern-making process [5]

Stage	Characteristic assessed	Significance for garment construction
1	Fibre composition	Assessment of the general properties of the material

2	Thickness and density	Taking the volume of the garment assembly into account
3	Elasticity	Assessment of deformation during movement
4	Extensibility	Determination of properties in the warp and weft directions
5	Shrinkage	Taking technological dimensional changes into account
6	Shape retention	Assessment of the finished garment's appearance

This approach makes it possible to identify the relationship between material properties and construction allowances.

10. Proposed construction approach

Based on the analysis, it is recommended that ease allowances in men's jacket design be determined by considering three main factors:

1. Anthropometric factor – the dimensions and shape of the human body.
2. Construction factor – the jacket silhouette, pattern-making method and dimensions of its construction components.
3. Material factor – the physical, mechanical and technological properties of the fabric.

The relationship among these factors can be represented by the following general mathematical expression:

$П_г = f(A, C, M)$

where:

- A – anthropometric indicators;
- C – construction parameters;
- M – material properties.

This expression represents the general conceptual model of the proposed approach. To convert it into a practical calculation model, the quantitative relationship between material properties and ease allowances must be established experimentally.

Conclusion. The theoretical analysis showed that the amount of ease allowance in men's jacket pattern making is directly related to the garment silhouette, body measurements and selected pattern-making method. The M. Müller & Sohn, TsNIISHP, SOTShL and EMKO SEV methods were found to differ in their principles for determining construction parameters and distributing allowances. It was established that the thickness, elasticity, extensibility and shape-forming properties of wool suiting fabrics significantly affect garment fit. In addition to determining the total ease allowance along the chest line, its proper distribution among the back, front and armhole areas was found to be important. Taking dimensional changes during steam-and-heat treatment into account helps maintain the shape and dimensional stability of the finished garment. Overall, the quality of men's jacket construction can be improved by evaluating anthropometric, construction and material properties in an integrated manner.

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