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DETERMINING THE ARMHOLE AND SLEEVE FIT OF MEN'S JACKET

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Abstract
This article discusses the stages of controlling the armhole and sleeve setting in men's jackets, emphasizing the importance of sleeve alignment with body structure, comfort, and design appearance. It highlights the use of control marks (notches) to ensure proper connection between the sleeve and the armhole, the distribution of ease percentages when attaching the sleeve to the armhole, as well as different allowances and adjustments for various construction cuts. The paper also provides information on the adaptation norms for different types of materials.

Keywords: Jacket, construction, armhole, sleeve, misfit, movement discomfort, shape, quality determination, armhole line, arms at joint boundaries, elliptical form, closed width, ease, wearing comfort.

Introduction

One of the most important constructive and technological components in tailoring a men's jacket is the proper alignment of the armhole and the sleeve. If these parts are incorrectly designed or sewn, the jacket will not fit the body properly and will restrict movement. For this reason, designers and constructors pay special attention to the armhole and sleeves during the jacket design process.

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The correct determination of the armhole's shape, size, and its position relative to other construction elements defines the overall quality of the garment's design. In garments with set-in sleeves, the armhole line is generally located at the boundary of the arms and the torso joints, and in the finished product, it represents a closed elliptical contour. At its lower part, the armhole line extends below the contour of the arm. Lowering the armhole line is necessary to provide freedom of arm movement and to ensure wearing comfort when layering the garment over other clothing items [2].

Main Part

The armhole is the open part under the shoulder and armpit that ensures the free movement of the arms. It plays a crucial role in the comfort and harmony of the garment. It is a special cut in the garment intended for attaching the sleeve and is the point where the sleeve is connected to the main parts of the garment (front and back panels). The correct shape and size of the armhole provide comfort during wear and influence the overall appearance of the garment [1]. The external appearance of men's jackets is greatly affected by this feature [10]. Figure 1 illustrates set-in sleeves with double seams, both correctly and incorrectly attached to the armhole.

In garment design, it is necessary to consider not only the style but also the body's anatomy. If the armholes are too small or too wide, they can restrict movement or create an undesirable appearance (Figure 2).

Key characteristics: The armhole is one of the most important structural elements of clothing. Its correct construction determines:

- The wearing comfort of the product;
- The proper positioning of the sleeve;
- The overall appearance of the garment.

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Figure 1. Correct and incorrect attachment of a set-in sleeve to the armhole.

Types of armholes: Depending on the garment design, armholes can be classified as follows:

- Wide armhole – commonly used in sportswear and casual clothing;
- Straight armhole – the classic option for business attire;
- Dropped armhole – typical for knitted garments and certain types of dresses [9].

Measurement parameters: To properly design an armhole, the following measurements must be taken:

- Armhole length – measured along the upper and lower edges of the back and front parts;
- Vertical diameter – the distance from the end of the shoulder line to the armhole line;
- Closed armhole depth (height) – measured using a flexible measuring tape.

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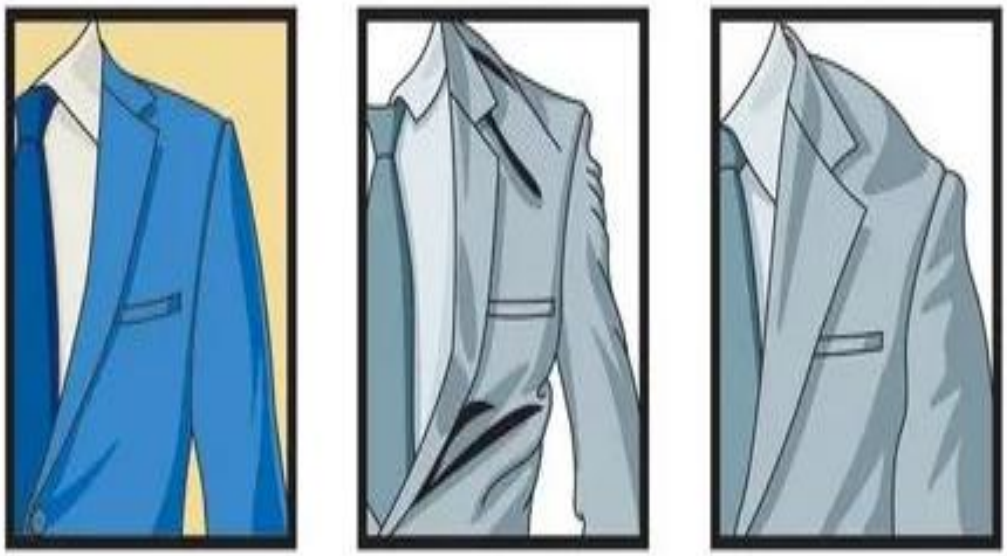

A **B** **D**

A-correct, B- too small, D- too wide.

Figure 2. Types of sleeve insertion

A properly designed and finished armhole ensures both comfort and durability of the garment. During the sewing process, it is important to pay special attention to the accuracy of details and the quality of finishing this element.
In modern fashion, there are numerous variations of armholes, ranging from classical to innovative solutions, which allow the creation of various garment silhouettes [4].

Armhole line: The correct determination of the shape, size, and placement of the armhole largely depends on the overall construction quality of the product as well as the composition and types of materials used [3]. In garments with set-in sleeves, the armhole line is usually located at the boundary where the arm connects to the torso, and in the finished garment, it represents a closed spatial elliptical curve.
At the lower part, in the armpit area, the armhole line extends below the contour of the arm. Lowering the armhole line is necessary to ensure freedom of arm movement and to provide comfort when shifting the lower layers of the garment, as shown in Figure 3.

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In the back and front patterns, the armhole line remains open. The upper ends of this curve correspond to the previously established points at the outer ends of the back shoulder (14′) and front shoulder (14″) cuts. To construct the complex contour of the armhole line, a series of reference points are established. Two of these, points P5 and P7 (332 and 352), located on the 3rd and 5th verticals, define the boundaries of the back and front parts of the armhole. When attaching the sleeve to the armhole (back and front notches), these points serve as control marks (notches) [6].

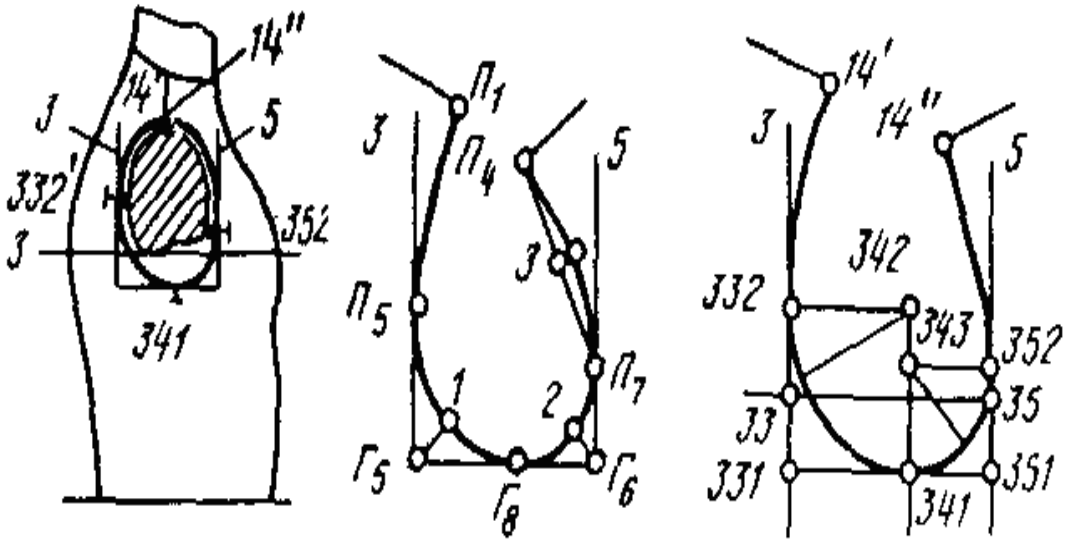

Figure 3. Armhole line in garments with set-in sleeves

The third reference point, G8 (341), is the intersection of the horizontal depth line of the lower armhole (G5–G6, 331–351) with the armhole contour. The position of this point is determined according to the ratio 0.62:0.38 based on the armhole width, or it can be slightly shifted forward using empirical (experience-based) calculations.

The most accurate method of shaping the contour line of the lower armhole (332–341–352) is through radiusing. In other cases, the armhole line is drawn as a smooth curve, primarily determined by the notches (P5 and P7) located on the bisectors of the rear and front armhole angles, as well as auxiliary points 1 and 2.

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The upper parts of the armhole curve are constructed by selecting circular arcs, projective discriminants (constraints), or by determining the positions of auxiliary points along the bending axes of the curves [4].

Distribution of seams along the armhole and sleeve cap:

To ensure a proper connection between the sleeve and the armhole, control marks (notches) are applied (Figure 4). These marks are necessary for defining the correct balance when sewing the sleeve into the armhole [7]. The placement of lines depends on the actual adjustment, which is determined by the difference between the measured sleeve cap length and the armhole length in the drawing.

$P_{POS} = D_{OK} - D_{PR}$

Where: P_{POS} -allowance for sleeve ease,

D_{OK} - armhole length;

D_{PR} - sleeve cap length.

The armhole length is measured from point P1 to point P4. The notch at the lower front part of the sleeve is marked as P5. To determine the notch corresponding to the front armhole, the segment G6P50 is measured upward from point G6:

$G_6 P_{50} = PP_5 + 0{,}5$

Where: PP_5 - the drawn sleeve segment

From point P_5, a horizontal line is extended leftward until it intersects the armhole line at point P_{51}. Point P_{51} is considered the front lower notch of the armhole. The armhole and sleeve cap are divided into **five sections** (Table 1).

Table 1. Distribution of seams along the armhole and sleeve cap

Plot number	Site designation		Distribution share
	Up our sleeves	In the sleeve of the sleeve	
I	R_5 14	R_5 41	13
II	4P_4	41P_{41}	22
III	R_{51} R_{91}	R_5 R_9	6
IV	R_{91} R_{01}	R_8 R_{10}	24
V	R_{01} P_1	R_{12} P_{41}	35

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The front upper notch of the armhole corresponds to point 4 on the front part. To obtain the corresponding notch on the sleeve cap, the section P_5–14 of the armhole is measured, with an additional 13% ease allowance added. The resulting value is then measured upward from point P5, giving point 41, which represents the front upper notch of the armhole.

The front and back upper notches coincide with the shoulder seams at points P_4 and P_1 (P_8). To obtain the upper notch of the sleeve cap, the section 4–P_4 of the armhole is measured, and an additional 22% ease allowance is added. The resulting measurement is then marked upward from point 41, giving point P41, which is the upper notch of the sleeve cap [8].

To obtain the notch on the armhole corresponding to the front seam position of the sleeve, the section P_5–P_9 of the armhole is measured, with 6% of the ease allowance subtracted. The resulting value is applied downward from point P51 along the armhole line, giving point P_{91}.

For the notch corresponding to the elbow seam position of the sleeve, the section P8–P10 of the armhole is measured, with 24% of the ease allowance subtracted. The resulting value is applied along the armhole line to the left of point P91, giving point P01.

In the final section of the armhole, P_{12}–P_{41} corresponds to the armhole section P_{01}–P_1, with 35% of the allowance remaining.

For the back armhole, in the interval between points P_1–P_8, no ease distribution is applied [5].

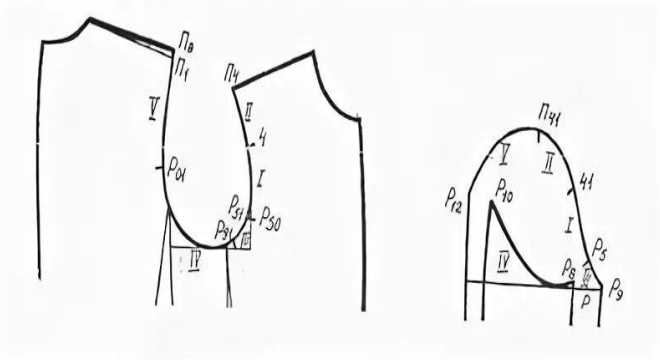

Figure 4. Control marks ensuring the correct connection between the sleeve and the armhole.

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