

Guido Hofenbitzer

Patternmaking for Fashion 1 Basic Practice

1st Edition

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Patternmaking for Fashion 1

Basic Practice

This publication is aimed at trainees and advanced learners in the clothing industry, at professional experts, and at interested amateur sewers who - with interest, skill, and plenty of trial and error - want to gain exposure to the basics of pattern drawing by being their own teachers.

Those who can independently create precisely tailored clothing patterns according to their own designs after some practice and experience, won't have to depend on readymade patterns that can be purchased from stores.

This book contains the most important guidelines for the design of basic patterns for skirts, trousers and bodices as well as suggestions and instructions for many alterations or modifications from basic patterns to model patterns. However, being able to convey the sense of a good fit and a perfect cut is not enough, it must be learned and experienced through practical testing.

Starting with a detailed introduction, the design of simpler basic patterns is shown in easy-to-grasp steps. Even complex topics are illustrated clearly with the help of figures which are abundant in this book. This is followed by designs of model patterns up to the finished production pattern, according to which, the cutting is done.

The chapters are structured thematically. The designs become more and more complex as the chapter proceeds. Some techniques are shown in an exemplary way, e.g. on a skirt, which can however also be applied to a dress, since it also contains a skirt part.

The end of 19th century witnessed the rise of ready-made clothing which also entailed rational cutting methods. Various pattern systems were developed, which are now taught at vocational schools. It is not uncommon for a school to teach according to its own system.

A uniform patternmaking system is neither available in Germany, nor in Europe. This book also doesn't introduce a new system for patternmaking. Instead, it seeks to simplify tried and tested pattern designs and touch them up for teaching purposes. The basic designs of the "Müller und Sohn" pattern system, Munich, the "Optikon" system of the Niederrhein University of Applied Sciences were significant sources of inspiration for the creation of the basic patterns. I owe interesting variations of the pattern modifications to "Patterndrawing for Fashion Design" by Helen Joseph-Armstrong. I would particularly like to thank my editor Hannelore Eberle for her excellent cooperation. I would also like to extend my gratitude to all my colleagues and students who have given me constructive criticism and suggestions after having used the manuscripts of the previous edition and tried out details.

I wish you great success and joy in designing the basic patterns and working out the model patterns according to your needs and ideas.

The author and the publisher would gladly welcome any suggestions that will contribute to improve or supplement the material in this book.

This 1st volume Basic Practice contains

- general explanations on creating a pattern
- taking measurements
- standards for pattern drawing
- all the important basic patterns
- established basic pattern-conversions
- basic shapes and dividing seams
- neckline design and darts
- many established model developments, where sleeves, pocket and collar designs are demonstrated and described in detail
- developments of facings and linings ...

The 2nd volume Professional Practice contains

- overview to the basic pattern of the 1st volume
- basic pattern for plus size figures
- basic patterns and models for sportswear, lingerie and unisex clothing
- a collection of common collar models
- a collection of common hoods
- a collection of common pocket variants
- a collection of common sleeve models
- established model developments
- Size chart for plus size figures and other templates

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Aim of the book

This book should help you with the creation of basic patterns and model developments by studying on your own so you will be able to cut and make your own models. The book illustrates model developments, which should encourage you to implement your own ideas and completely new creations with the help of the presented principles.

Technical language and abbreviations

The book uses a technical language with common terminology. These are mostly explained in the text and in the design instructions; however, some of them also emerge from the context. There are a lot of complicated and interrelated combinations of terms, which are usually abbreviated. In this book, the abbreviations are used systematically and clearly. Explanations with regard to this and various listings and examples are given in the attachment and on the following pages.

Sequence

After introductory information and introduction to taking measurements, you will first find forms that collect your data clearly and completely. These forms are also available online.

After the basic pattern designs, models are shown, which can be developed from these basic patterns.

The designs that are shown, are mostly self-explanatory. The sketches should ideally be sufficient for a successful design. Supplementary descriptions with information and tips additionally explain almost every design.

Complex models and patterns are divided into sub-steps, e.g. in "model design", "collar design" etc. These numbered sub-steps are described point by point (using blue dots with white numbers) in optimum sequence. These points can be found in the text and on the sketches.

Colour is information

Various colours are used in all designs, which stand for certain information. Areas, lines, terms and abbreviations as well as numerical values in specific colours make quick visual perception easy. Thus, a green lining area can be clearly distinguished from a yellow facing or a thick black circumference line can be clearly distinguished from a dotted green dimensioning line. All line types are explained in this chapter on page 19. Page references make it easier to find details.

When working with this book you will quickly learn to recognise and appreciate this information.

Standard

The standards for pattern designs described at the end of the introduction chapter will probably only be usable for the beginners after some experience. Principle process techniques are explained, which are used again and again when creating patterns.



The rulers shown in this book are available here: www.pattern-max.de

Abbreviations and symbols Classification, characteristics, figures, values, operands, actions

Classification of abbreviations

- The classification aims to make it possible for you to create new abbreviation combinations which are simple and understandable.
- The abbreviations are read just the way the combinations of terms are spoken.
- For abbreviation combinations the abbreviations are combined without any spaces or points.
- A hyphen replaces a preposition or modal conjugation, e.g. cF-S = centre front as seam or 2×-sy Fa = cutting of two pattern pieces symmetrically (symmetrically identical) from the main fabric.
- **Directions, positions and characteristics** are symbolised by lower case letters, which are always at the beginning of an abbreviation combination (upBG = upper back gauge).

- (Measured) figures and values are symbolised by an upper case letter (except "radius" = r, owing to mathematics) and are always at the end of an abbreviation combination (upBG = upper back gauge).
- Terms with regard to patterns are symbolised with one capital letter (S = seam) or with one capital letter plus one or two small letters (PlIn = pleat intake).
- **Body parts** are symbolised with an upper case letter plus a lower case letter (e.g. Neh = neck hole).
- **Double used abbreviations** are the **A** and the **r**. They are not to confound.

The A mens arm and is located at the beginning of an abbreviation e.g. AG (arm gauge). And at the end of an abbreviation the A means angle e.g. ShA (shoulder angle). The r means right at the beginning e.g. rShP (right shoulder point) and r with suscripted indication means radius e.g. r_{waw} (radius of the waist width).

A list of abbreviations is shown on side 340.

Characteris	tics	Operan	ds	Figur	es and values
b back c cent f fron l left m mea me mea o over r righ s side sy sym un unde up upp tr tran	k tral isured isure r t metric er/dowen/lower er/above/top isfer	+ - : and / × = ≙ %	plus minus divided by multiply in calculations multiply or times in text is equal to corresponds to per cent	A C Di Dia Dif F G H In L r W ∑	angle circumference depth distance diameter difference factor (math.) gauge, width height intake length radius (math.) width (sigma) sum

Other important symbols and abbreviations are printed on page 26 and from page 332 onwards.

-			
Some	e important symbols		Production information
188	Page references to basic patterns, de- tails and instructions	ļ	Cutting marks indicate how the pattern pieces are to be cut out of the fabric.
1	Numbering of the design sequence and assignment of the descriptions in the text. The points are mostly blue; points in other colours symbolise al- tornatives and variants.		• An industrial pattern is mirrored sometimes at the cB or cF. For an individual cutting on the fold , the cB of this pattern is layed at the center fold of the double layed fabric (right sides facing inwards) and is then cut through both layers.
46	Numbering of variants (sleeve, dart		Shaping marks indicate where and how the fabric area must be permanently shaped (e.g. by ironing) before sewing:
	etc.)		• When stretching, for example, seam allowances, seams
0	Note for special attention	$\times \times \times$	or areas within the fabric area are extended. This gives
AP	Attaching point		additional length or width to the fabric- depending on the direction of stretching.
PP	Pivot point, centre of rotation		• When compressing, the material is kept short. The width
8	A cut (slash) is made for further use		or length is reduced.
	The sign for a right angle (90 $^{\circ}$)	555	• Gathering marks indicate the area where the fullness of a seam is gathered into small, irregular tucks (pleats) using a suitable method.

What is a pattern?

"The dress has an excellent cut!" raves a representative at the fashion fair. What does it mean by that?

The design of the dress seems to be extremely interesting and it seems to have been produced according to the fashion trend.

The "cut" thus refers to the shaping of fabric pieces from which the articles of clothing are sewn together. Here, the two-dimensional "flat" fabric must be brought to the threedimensional body shape.

The **pattern technique** is the construction of the patterns for the fabric pieces according to the desired fit and the model, from which a piece of clothing is made.

This is how a pattern is made. The individual pattern pieces are cut out of fabric and sewn together again so that the body is wrapped as desired.

In the case of single-piece production, the patterns are made according to the wishes and individual measurements of the customer. Series production starts with the ideas of the designers. They are tailored to target groups and are forwarded to the pattern cutters or pattern makers as sketches and model descriptions.

Pattern makers play a significant part in the design of the product. They choose the basic pattern, which are constructed using average measurements, form seams, edges or necklines, add width to the pieces of clothing and position pockets and small items. They are therefore responsible for the "perfect style" and optimum fit. Furthermore, they have to follow rules so that the pattern is legible and suitable for production.

A **pattern** is a design made of paper or cardboard - also in digital form for automatic cutting - for cutting a fabric. It must be interpretable by cutters who may speak a different language. The information on the pattern must be clear and unambiguous.

Thus, **patternmaking** is a demanding and responsible work between design and production. It requires creativity, a good sense of shape and proportion and a lot of technical understanding for the production of clothing.

Manual pattern creation

The customer is measured; the body measurements are collected in a **measurement chart.** The industry works with measurements from **size charts.**

A **construction chart** is created for the design of a basic pattern. Here, the necessary width allowances are added to the body measurements to obtain the construction measurements.

The **basic pattern** is supposed to wrap the body optimally. It is created with the construction measurements according to various rules of design. The fit is checked using sample sewing.

For the design of **first patterns** of a model, the area of the basic pattern is changed such that the individual pieces of a pattern are present at the end. This is done for the trial fitting. In the clothing industry, designers and pattern makers check the fit and the shape.

The **model pattern** is the product of all further changes to the basic pattern.

All seam allowances, markings and labels are also attached to the finished **production pattern.** It serves as a template for the cutting layout creation.

Tools

For the manual patternmaking, various angle and curve rulers, pens, pencils and erasers, measuring tapes, compasses, paper scissors, weights, pins, pattern traces, punchers, clippers and hangers for the patterns are used for the patterns.

CAD

In the clothing industry, patternmaking is mainly done by modern CAD systems. A CAD system essentially consists of a computer, CAD software, digitising tablet and plotter. Patterns and entire pattern images are sent digitally around the globe and are thus available without losing any time for production on the other side of the world.

Gradation

The first pattern in the ready-made clothing factory is created in a basic size. Starting from the pattern pieces of a model, the model pattern pieces of smaller and larger sizes are determined by proportional reduction or enlargement (grading). A distinction is made between manual grading, semiautomatic grading and digital grading using a CAD program.

Methods of cutting

The production pattern normally consists of several pattern pieces. These are placed on the fabric in compliance with various rules. After that, the fabric pieces are cut out, marked and sewn together to create the desired garment.

There are different cutting methods for the different production methods as well:

Traditional individual cut

For a single custom-made production, the fabric is doubled (the right side of the fabric is insinde, the wrong side is outside) with a centre fold between the selvedges. The model pattern pieces are attached and the seam contour is traced on the fabric along the pattern paper with tailor's chalk. Then, parallel to this, the seam and hem allowances are marked out, along which, the cut is made. When the seam lines and markings are transferred or "pierced" with tacking thread, stapled together for a fitting.

Rational manual method

The pattern pieces are created with (production pattern) or without (model pattern) seam allowances, placed on the fabric, pinned or weighted down with weights. The seam lines are not marked, but the pattern pieces are cut with exact seam allowances. Edge markings are pinched on the pattern edge by punching, surface markings are made by punch points. The garment can be sewn for trial fitting or immediately finished without trial fitting.

Industrial methods

Production patterns for series production are designed with seam allowances. These templates are used to create an optimised, waste-saving cutting layout. As a rule, several layers of fabric are laid out on one long web. The cutting layout is designed for this web. The pattern pieces are cut out with cutting machines, notches and drill holes are applied with special equipment. The production pattern are labelled, sorted and transported to production department.

Nowadays, companies design their patterns with a CAD program, optimise the cutting layout also with a computer program and plot (print) the cutting layout on a wide paper web that corresponds to the fabric web. Cutting and marking is done as mentioned above.

Many companies are moving away from plotting the cutting layout in 1:1 and do the cutting and marking "online" with computer-based cutting machines.

The human body

The most important proportions of the human body are shown below. This means the correct dimensional ratio of the various body sections to each other.

For model design, the designer must have "an eye" or a sense for the harmony of body proportions.

For the designing of patterns, "reading" the model drawings and fashion photographs requires knowledge of proportions and normal body growth. Model designs must be interpreted correctly and proportional deviations must be identified. It is important to know how the body can be dressed advantageously and how the "problem zones" can be concealed.

The ideal standard figure

It is a blend of various figure types and is constantly evolving between consumers, sellers and manufacturers. The standard measurements of the ideal figure are determined by successful manufacturers and the general societal consensus for the perception of a "perfect body". A figure is considered ideal when its measurements satisfy the majority of all customers. The term "ideal figure" refers to a figure, a silhouette and the collection of various body measurements.

Silhouette and proportions of this standard or normal figure serve as a basis for the development of new designs and trends. Its measurements are used to develop the pattern: the figure is needed to check the fit. The manufacturers use this figure for the selection of their models and for presentation in the sales rooms. And the customers dream of it. There is hardly anybody who has a figure that corresponds to this ideal figure at all points.

Even though this ideal figure is constantly adapting to the spirit of the times, it does have some standards:

It always stands upright, is symmetrical, has aesthetically harmonious body proportions and, in the case of women, a difference between bust or hip and waist circumference of 25 to 32 cm.

There will never be a globally standardised ideal figure. It differs because of the various figure types in the individual regions. Many countries have their own standards and size systems.

The figurine with eight head theory

If you take the head length of an adult person and divide the body height between the standing plane and the crown line (without hairstyle) by this head length, you get 7.5 to 8 partial lengths.

The partial heights are - depending on the figure type - slightly different at prominent body positions.

To make figurines for clothing representations appear as slim and aesthetic as possible, they are drawn with at least an eight head theory.

Some figurines, especially those for fashion illustrations, are even drawn with a 81/2-fold, 9-fold or even greater head length, whereby the legs are slightly extended.

The height of the 8-head figurine used in this book is designed on a scale of 1:16 for a normal figure with a body height of 168 cm (length = 168 cm: 16 = 10.5 cm).

For a natural person with a body height of 168 cm, each one-eighth is therefore ideally 21 cm high (partial length = 168 cm: 8 = 21 cm).

Use of the figurine:

The proportions of lengths can thus be determined arithmetically. Since figurines are always idealised and the figure represents a three-dimensional body, the width proportions may only be estimated.

This is aggravated by the assessment of the area that is only visible to a limited extent due to its three-dimensionality. Only about 25% to 75% of the areas highlighted here in pink are visible.

The surfaces that are further to the side, which are marked with red lines or areas, are almost invisible.

Comparison of lines of the sight on a figurine sketch and a drawing





Taking the right measurements and observing figures are the basic prerequisites for a well-fitting pattern.

However, it would be a false conclusion to think that you only have to take exact measurements and design the patterns according to these measurements in order to obtain a suitable customised pattern.

It is not possible for a pattern to fit optimally at all times if deviations in growth and posture are not identified and considered. These pattern adjustments for a deviation often have to be done after the construction of a basic pattern.

The following dimensions are measured values related to the female body, which are measured, calculated or estimated as a basis for the pattern design and are noted in charts.

The left and right sides of the body are always mentioned and noted according to the customer's left and right sides.

Most measurements are taken with an upright, naturally relaxed posture on a body dressed only in a bra and a panty. The measuring tape must fit the body smoothly, i.e. not too tight and not too loose. The measurement should always be done quickly and in a sensible sequence.



- **Body measurements** are taken according to the defined rules for relevant anatomical body areas.
- Chart measurements are representative body measurements determined by serial measurements which are then assigned to the clothing sizes.
- **Construction measurements** are measurements that are required for the pattern design of a basic pattern and may already contain convenience allowances.
- **Proportion measurements** are construction measurements that are difficult to measure; they are calculated from the body measurements according to mathematical rules.
- **Control measurements** are measuring sections on the body in order to design the pattern construction to fit.
- **Finished measurements** (fabric measurements) are measured on the production pattern and on the garment piece and, if necessary, compared with the chart measurements for quality control.

BoH

BrC

1 Body height

□1 It is measured from the top of the skull to the standing level, i.e. without shoes on and without voluminous hair on the head. Suitable measuring devices are an anthropometer, a plummet tape or other precise measuring tools on a vertical line.

2 Breast circumference

□1 The measurement is taken by standing behind the customer. Lay the measuring tape horizontally over the bust points, pass it underneath the arms and **slightly lift it above the lower part of the shoulder blades**. The measuring tape is tightened such that it is fitted, but it must not be too tight. The value can then be taken approximately at the middle of the back.

Waist circumference horizontal WaC

□1 A waist measuring tape (waist tape) is laid just below the narrowest part of the body, halfway between the lower costal arch and the hip bone (shown in blue). It is laterally at the narrowest point of the body and laid **as horizontally as possible** towards the standing plane. The reading of the waist circumference is taken and the waist tape remains laid down until the end of the measurement.

The waist tape is sometimes a few centimetres higher or lower at the front or back - this is acceptable when you are beginner.

4 Hip circumference horizontal HiC

□1 The body is viewed from the side and the measuring tape is placed horizontally around the strongest part of the buttocks. If you let it slowly glide horizontally over the buttocks downwards, the measuring tape adjusts such that even a lower lateral curvature can be measured.

Waistband circumference WaBaC

 \Box 1 The measuring tape is transferred above the buttocks to a "position comfortable for the customer" and sometimes (in the case of heavy figures) at the front in the skin fold on the stomach area, or where the person usually wears the skirt or pants. Here, (especially with heavy figures) the waistband will always come to rest.

6	Front waistband distance	fBaDi
	Waistband distance at side	sBaDi
	Waistband distance at back	bBaDi

 $\Box 2$ The distance at the front, sides and back between the lower edge of the waist tape and the lower edge of the waistband is measured.

Central waist heights	cWaH
Waist height at front and back	fWaH / bWaH

 $\Box 2$ With the plummet measuring tape, the distances between the lower edge of the horizontal waist tape and the standing level are measured. The waist tape sits low at the waist's narrowest point. According to definition: Halfway between the lower costal arch and the hip bone at the side. Especially when it comes to plus size figures, the waist tape must first be placed horizontally in order to be able to measure the distance to the waist tape circumference at the front (see above).

8	Waist heights on the side	sWaH
	Right and left waist height	rWaH/ lWaH

 $\Box 2$ On both sides of the body (left and right) the plummet tape is used to measure the distance between the lower edge of the waist tape and the standing level along the body.

9 Neck onset circumference

 \Box 1 The measuring tape is placed over the 7. Cervical vertebra at the back and along the collar bone at the front, well below the Adam's apple through the hollow located there (see page 10).

NeC

mBL

mBrD

mFL

10 Measured back length

gui

 \Box 3 The measurement must be taken from the 7. Cervical vertebra (Cv) (or the back centre of the neck) along the spine to the lower edge of the horizontal waist band. The measurement tape must sit with its lower edge at the lowest point of the horizontal waist (narrowest point on the rear torso).

11 Measured breast depth

 \Box The measurement must be taken from the cervical vertebra (Cv) tightly around the neck to the breast point (BrP). Both halves of the body should be measured. The construction measurement of **BrD** is calculated.

12 Measured front length

 \Box 3 The measurement is taken from the 7th cervical vertebra along the neck over the breast point vertically to the lower edge of the **exactly horizontal waist tape** and this is done on both sides of the body. The construction measurement of the FL is calculated. The mFL must not be measured to the WaBaC!

It often happens that the waist tape cannot be put on horizontally. It is lower or higher at the front or back. The tilted position of the waist must be observed in the waist height from the side.

In the measurement chart, in the lines of the back length and front length, this tilted position of the waist must be noted in the space provided and the BL or FL must be corrected accordingly.

Such a tilted position of the waist does not necessarily indicate a figure problem.



□2 Measurements below the waist



□3 Length measurement above the waist

For the front length (FL) and the back length (BL), it is important that this tilted position of the waist is compensated for in a mathematically reasonable way. Both values must then be available as if they had been measured for a waist tape laid horizontally.

Example: If, for example, the waist tape at the back is visibly 1 cm lower (-1 cm) than at the front, the BL must be reduced by 1 cm, because the horizontal waist tape should actually be 1 cm higher there - thus, the measured BL here is 1 cm too long.

upBG

AhD

mBG

mAG

mBrG

13	upper	back	gauge
----	-------	------	-------

G4 Control measurement: Measurement should be taken between the arm onset folds **over** the shoulder blades.

Now pass a **(adhesive) paper strip** that is approx. 2 cm to 4 cm wide (possibly slightly sticky) under the highest point of the arms and glue / lay it exactly horizontally over the back. The strip must be visible at the front.

14 Armhole depth

 $\Box 4$ The measurement must be taken from the 7th cervical vertebra along the spine till the **upper edge** of the paper strip.

The measurement can also be calculated (see measurement chart) for checking purposes. If there is a large deviation, the measured dimension is corrected in the direction of the calculated value. With a large shoulder angle (steeply shoulders) the AhD will be a larger, with a smaller shoulder angle (flat shoulders) the AhD will be a shorter.

15 Measured back gauge

 $\Box 4$ On the paper strip, mark the back of the **arm onsets** with loose and naturally hanging arms using a pen held perpendicular to the body. The **BG** used for the patternmaking results from mBG: 2

16 Measured arm gauge

 \Box 4+5 On the paper strip, mark both front arm onsets at the upper edge of the paper strip with arms hanging loosely and naturally. The AG required for the patternmaking is the average value between the right and left measurement.

17 Measured breast gauge

□5 Measurement must be taken over the sharpest curves of the breasts to the front arm onsets and in doing so, the measuring tape must run exactly horizontally under the front arm onset markings, which are usually higher. The BrG used for the patternmaking results from mBrG: 2.



 $\Box 4\,$ Measured back gauge, upper back gauge and armhole depth



□4a Short armhole depth with flat shoulders

□4b Large armhole depth with steep shoulders



□5 Measured back gauge and measured arm gauge





The measurement of mBrG must be taken exactly horizontally towards the front arm onset mark - not towards the upper arm!

Measurement problems often arise, especially when determining the mAG and mBrG.

The BG can be determined with relative certainty, as described above: BG = mBG : 2

The AG is calculated with more certainty from the upper arm circumference (upAC, see following page): AG = upAC × 0,6 -7,5 cm

The BrG can now be calculated using the measured breast circumference (BrC): BrG = BrC:2 - BG - AG

18 upper bust gauge

6 With loosely hanging arms, the measurement above the breasts is measured between the front arm onsets.

upbG

19 upper bust distance upbDi

 \Box 6 Simultaneously with the upper bust gauge, the other end of the measuring tape is used to measure the distance between the lower edge of the measuring tape and the breast point.

20 Underbust circumference UbC

 \Box 6 The measuring tape is taken horizontally from the back under the breast and under the arms and the reading is taken at the back.

21 Underbust distance UbDi

 \Box 6 Simultaneously with the underbust circumference, the other end of the measuring tape is used to measure the distance between the upper edge of the measuring tape and the breast point.

22 Shoulder gauge

ShG

 $\Box 2$ The measuring tape runs from the highest point of the shoulder at the neck sidewise (where the neck hole seam should be) towards the outermost shoulder bone sidewards (where the armhole seam should be). It is advisable to measure both sides and note the average value.

```
23 Arm length AL
```

 \Box Along the outer edge of the arm, the measurement of the length between the shoulder point over the slightly angled tip of the elbow towards the outer wrist joint is taken using the measuring tape. The arm should be bent at the elbow at an angle that does not exceed 45°.

24 upper arm circumference upAC

□6 With the fitting measuring tape, the circumference is measured horizontally at the sharpest point below the armpit with the arm naturally hanging down.

25 Wrist circumference WrC

 $\Box 6$ With the measuring tape, the circumference is measured over the sharpest part of the wrist joint.

26 Hand circumference HaC

 $\Box 6$ With the measuring tape, the circumference is measured over the sharpest part of the closed hand.

27 Arm onset circumference AonC

□7 With a thin measuring tape or cord, the measurement is taken under the armpit over the side of the shoulder.

ShA

28 Shoulder angle

 \Box 7 With an angle metre (smartphone with (bubble level app)), the angles of the shoulder between the neck and the shoulder point may be measured with a smart phone. The average value is 20°. If the right and left values are different, the smaller value must be used!



□7 Breast, arm and shoulder measurements



HiD

CrL

29 Hip depth

 \Box **9** The measuring tape is used to measure the distance between the lower edge of the waist tape and the sharpest point at the hip sidewise along the curve of the body.

30 Crotch length

 \Box 9 The measurement between crotch and standing level is measured with a crotch-measuring tape - but often only calculated for women.

31 Crotch height CrH

 \Box 10 The crotch height is measured while being seated on a flat surface. The waist tape must lie horizontally here (see waist heights). The measurement is taken to the left and right from the lower edge of the waist measurement tape to the level of the seat along the curve of the body. The average or shorter measurement is used. Suitable measurement device is the plummet tape.



□10 Crotch height from the horizontal waist tape

32 Thigh circumference ThC

 $\Box 11~$ The measurement is taken above the sharpest point of the thighs.

KnC

CaC

33 Knee circumference

The measurement is taken over the sharpest part of the knee.

34 Under knee circumference unKnC

The measurement is taken above the narrowest point below the knee.

35 Calf circumference

The measurement is taken above the sharpest point of the calf.

36 Ankle circumference AnC

The measurement is taken above the sharpest point of the ankle.

37 Heel-instep circumference IsC

The measurement is taken below the heel and above the instep (back of the foot) with the foot stretched.



□9 Measurements below the waist



Measurements taken

The measurements, for example, the waist circumference are measured and noted in the measurement chart (next page, templates in the attachment).

Calculated measurements

It is only possible to calculate some construction measurements, such as the neck hole width (NeG), which is calculated from the neck circumference (NeC). The formulae are in the measurement chart; the values must also be noted there.

Control measurement

Certain measurements are calculated for checking purposes, and this is done on the basis of other measurements, such as the armhole depth (AhD). Here, the measurement taken can be adapted to the value of the control measurement in case of a large difference.

Both sides of the body

The breast depth (mBrD), for instance, is measured on both sides of the body. Here, the average is usually calculated to determine the final breast depth (BrD).

Figure-related corrections

For the correct measurements of the back length (BL) and the front length (FL) you must also **observe the position of the waist tape**, which, viewed from the side, should ideally be horizontal.

□1 For example, if the waist tape is 1 cm lower at the back, the value of the measured back length (mBL) must be shortened for construction by 1 cm because it is too long. If, for example, the waist tape rises at the front, the measured front length (mFL) must be extended for construction accordingly.

The inclined waist position is only necessary for the correct measurement of BL and FL. Initially it has nothing to do with the position of a waist tape at the waistband position or with the measured waistband distances!

 $\Box 2$ Greater problems can arise with figures on which the waist tape cannot be laid horizontally. This is sometimes observed in heavier figures. When it comes to heavier figures, it is also difficult to determine the correct height of the waist because it is difficult to feel the lower costal margins and the hip bones.

Here, the waist tape likes to slip into the skin fold on the stomach area, i.e. on the waistband position and the tape falls off from the side to the front \Box 2. The correct position of the horizontal waist tape has to be forced here!

Checking the balance from BL and FL

For the measurements in the size chart, the back length (BL) and front length (FL) are optimally balanced for each individual size.

However, in case of individual measurements, it is essential to **check the balance** (on the bottom right in the measurement chart).

Individual balance

BL and FL are measured in relation to the horizontal waist tape or corrected for an inclined waist position. Now the difference of FL minus BL can be determined. This is the individual balance.

Optimal balance

The values of FL and BL must have a certain difference according to the horizontal breast **circumference**. You will find the values in the measurement chart in the red frame.

Balance problem

The difference between individual and optimal balance must be regarded as a balance problem that may need to be corrected after the construction.

TIP:

If you notice a balance problem that cannot be observed on the figure at first, it is always advisable to check the position of the waist tape again and to re-measure the BL and FL.

Figure observation and deviation

 \Box 1+2 For figure observation, the posture and special proportions of a figure are analysed (page 152 and 153). Apart from taking body measurements, this is another important task in taking measurements.

If the mFL is too long, it could be a figure with large breasts or a very straight back or both.

If the **mBL is too long**, it could be a figure with **small breasts** or **a round back** or both.

These are some of the ways in which such dimensional deviations can be interpreted. They can be determined with absolute certainty only with a thorough observation of the figures (to do that, please refer to volume 3).



Measurement optimisation, patternmaking and pattern optimisation

For the basic patternmaking, the mFL and/or mBL must now be corrected according to the figure observation so that the optimal balance between FL and BL is achieved. If necessary, this is noted in the measurement set (see pages 152 till 155).

After the basic construction in optimal balance, the figures of the changes of measurements with regard to BL and/or FL are revoked on the basic pattern according to certain rules, thus optimising the basic pattern.

If, for example, the measured BL is too long in case of a round back (see $\Box 6$), then the BL construction value is reduced for the pattern construction so that the balance fits. According to the design, there is now no length in the back part. After construction, the back is cut and opened and the previously shortened BL is put back into the pattern. The BL now has the measured dimension again. Opening the back increases the shoulder dart, which gives the back the necessary shape for the corresponding figure.

Problems below the waist

 \Box **1+2** Figure deviations below the waist must also be analysed with figure observation. Here, for example, in \Box **2** a longer bWaH is explained by the larger buttocks. Even here, the following should be measured in relation to the horizontal waist tape.

The skirts and pants basic pattern must be adjusted accordingly.

The present volume 1 only deals with the **basics** of patternmaking. Thus, not all solutions for the problems with regard to figures can be discussed and shown here.

Nevertheless, the problem is briefly explained here to give an indication that problems may occur. It should also be indicated as to where the solutions to problems with **individual** designs can be found.

Comprehensive information and stepby-step instructions for handling problems with regard to the fit can be found in **"Patternmaking for Fashion volume 3** (Customised patterns and fit, Master Practice, published estimated in 2023)".



□1 Flat buttocks □2

- □2 Heavy buttocks
- The fWaH is correct.
- The bWaH is shorted due to flat buttocks
- The fWaH is correct.
- The bWaH is longer due to the larger buttocks

The **mFL** is **too short** due to the sunken chest.

• The mBL is too long due

to the round back.

- The mFL is too long due to large breasts.
- The mBL ist korrekt.



The mBL is too short due to the upright posture.

fWaH

□4

Upright posture,

breast pressed forward

The mFL is too long due

ward.

to the breast pushed for-

- The **mFL** is **too short** due to the flat breast.
- The **mBL** is correct.



fWaH bWaH mBL is too short

Round back

The green dotted lines show the normal figure

Measurement chart		Name												
Measurements in cm		Date												
Body measurements			Comments:											
ВоН	Body height]											
BrC	Breast circumference													
WaC	Waist circumference		1/2		1⁄4									
HiC	Hip circumference		1/2		1⁄4									
WaBaC	Waistband circumfer.		1⁄2		1⁄4									
WaBaDi	Waistband distance waist tape to WaBa	f	t		r			Warning: The Widentical to the	Ig: The WaBaDi are not neces al to the inclined waist positi					
WaH	Waist height from flo	oor to waist ta	tape f			b		idor	mWaH					
				r	l			Idea	sWaH					
NeC	Neck circumference		С	alculatio	in:	NeC :	6 + 0,5 cm =	Neck gauge	NeG					
mBL	measured back length		±	inclined	back waist	t	=	Back length	BL					
mBrD	measured breast depth	r	ι		Ø	r	mBrD – NeG =	Breast depth	BrD					
mFL	measured front length	r	ι		Ø	r	nFL - NeG =							
			±	inclined	front wais	st 🛛	=	Front length	FL					
Place a paper strip horizontally just below the arm /				armpits and across the back.										
mAhD measur. Armhole depth			Check: (BoH + BrC) :10 - 6 cm AhD											
mBG	measured back gauge		C	alculatio	on:			mBG : 2	= BG					
mAG	measured arm gauge	r	l		Calculation/Check: upAC :		10 ·6 – 7,5 cm =	AG						
mBrG	measured breast gauge		1⁄2		Calculatio	on/Ch	eck: BrC	: 2 – BG – AG	<mark>=</mark> BrG					
upBG	upper back gauge		1⁄2			AL	Arm leng	gth						
upbG	upper bust gauge		1⁄2			upA	C upper ar	m circumfer.						
upbDi	upper bust distance					WrC	Wrist cir	cumference						
UbC	Underbust circumfer.		1⁄2			HaC	Hand cir	cumference						
UbDi	Underbust distance					Aon	C Arm ons	et circumfer.						
ShA	Shoulder angle in degree	r	ι			ShG	Shoulder	r gauge						
HiD	Hip depth			Breast ci	rcumf. BrC	Optir	nal balance <mark>Ba</mark>	Deviations or optimal bala	f up to 1 cm nce can be i	from the gnored, if no				
CrH	Crotch height			80 to 89	9		+ 3,5	figure proble In case of do	ems have be ubt, the me	en observed. asurements				
ThC	Thigh circumference		90 to 99		9	+ 4,0		towards the should be ta	horizontal v ken again!	vaist tape				
KnC	Knee circumference		100 to 1		109	(BrC - 100) : 10 + 4 5		and FL have	to be deter	nined by				
unKnC	under knee circumfer.		110 to		119	(BrC - 100) : 10 + 5.0		ingui e observ		stante 5j.				
CaC	Calf circumference		120 to ²		129	+ 5,0 (BrC - 100) : 10 + 5 5		1 Г	FL					
AnC	Ancle circumference		130 to ²		150	(B	rC - 100) : 10 + 6,0	1	minus BL	-				
InC	Instep circumference		Optima		l balance	Bal		Individu	al balance	=				
				Bal – In	dividual ba	alance	e = Balance	e problem =						

Ready-made sizes

Nationally defined standard sizes, according to which, clothing articles are sold within an economic area (e.g. Germany), are called ready-made sizes.

In German ladies' outerwear the size designations are derived from the BoH, BrC and HiC measurements (ready-made size = BrC : 2 - 6 cm).

The individual body measurements are determined by serial measurements and are valid as long as the clothing companies can easily sell their garment with these measurements. The values of the previous freely published series measurement from 1994 are outdated; however, they are safe to use.



□1 Label from a high visibility vest

With the EN 13402 EU standard, a new code system is supposed to be developed which, is supposed to replace many national size systems.



□2 Examples for pictograms

The newly developed pictograms for the labelling of clothing should contain the body measurements relevant for the respective garment.

Ladies ´	outerwear size	e chart of Ger	man ladies' rea	dy-made sizes	based on the	german serial	measurements of 19	94

	Size	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	
BoH	Body height				168												BoH
BrC	Breast circumference	76	80	84	88	92	96	100	104	110	116	122	128	134	140	146	BrC
UbC	Underbust circumference	68	71	74	77	80	84	88	92	98	104	110	116	122	128	134	UbC
WaC	Waist circumference	62	65	68	72	76	80	84	88	94.5	101	107.5	114	120.5	127	133.5	WaC
HiC	Hip circumference	86	90	94	97	100	103	106	109	114	119	124	129	134	139	144	HiC
NeC	Neck circumference	34.2	34.8	35.4	36	36.6	37.2	37.8	38.4	39.6	40.8	42	43.2	44.4	45.6	46.8	NeC
NeG	Neck gauge	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.1	7.3	7.5	7.7	7.9	8.1	8.3	NeG
AhD	Armhole depth	18.9	19.3	19.7	20.1	20.5	20.9	21.3	21.7	22.1	22.5	22.9	23.3	23.7	24.1	24.5	AhD
BL	Back length	41.4	41.4	41.4	41.6	41.8	42	42.2	42.4	42.7	43	43.3	43.6	43.6	43.6	43.6	BL
	Cv to hollow of the knee	100.6	100.9	101.2	101.5	101.8	102.1	102.4	102.7	103.1	103.5	103.9	104.3	104.7	105.1	105.5	
	Cv to stand	146	146.3	146.6	146.9	147.2	147.5	147.8	148.1	148.5	148.9	149.3	149.7	150.1	150.5	150.9	
HiD	Hip depth				21												HiD
BrD	Breast depth without NeG	25.7	26.5	27.3	28.1	28.9	29.7	30.5	31.3	32.5	33.7	34.9	36.1	37.3	38.5	39.7	BrD
FL	Front length without NeG	43.9	44.3	44.7	45.3	45.9	46.5	47.1	47.7	48.8	49.9	51	52.1	52.9	53.7	54.5	FL
upBG	Upper back gauge (½)	16.2	16.7	17.2	17.7	18.2	18.7	19.2	19.7	20.5	21.2	22	22.7	23.5	24.2	25	upBG
BG	Back gauge (1/2)	15	15.5	16	16.5	17	17.5	18	18.5	19.2	19.9	20.6	21.3	22	22.7	23.4	BG
AG	Arm gauge	7.5	8	8.6	9.3	10	10.7	11.4	12.1	13.2	14.3	15.4	16.5	17.6	18.7	19.8	AG
BrG	Breast gauge (1/2)	15.8	16.6	17.4	18.2	19	19.8	20.6	21.4	22.6	23.8	25	26.2	27.4	28.6	29.8	BrG
ShG	Shoulder gauge	11.9	12	12.1	12.2	12.4	12.6	12.8	13	13.2	13.4	13.6	13.8	14	14.2	14.4	ShG
ShA	Shoulder angle in degrees				20°						-						ShA
AL	Arm length	59.4	59.6	59.8	60	60.2	60.4	60.6	60.8	61.1	61.4	61.7	62	62	62	62	AL
upAC	Upper arm circumference	25.6	26.2	26.8	28	29.2	30.4	31.6	32.8	34.6	36.4	38.2	40	41.8	43.6	45.4	upAC
WrC	Wrist circumference	14.6	15	15.4	15.8	16.2	16.6	17	17.4	18	18.6	19.2	19.8	20.4	21	21.6	WrC
sWaH	Side waist height				106									sWaH			
ThC	Thigh circumference	50.2	52	53.8	55.6	57.4	59.2	61	62.8	65	67.2	69.4	71.6	73.8	76	78.2	ThC
CrH	Crotch height	24.9	25.3	25.7	26.1	26.5	26.9	27.3	27.7	28.3	28.9	29.5	30.1	30.7	31.3	31.9	CrH
CrL	Crotch length	81.1	80.7	80.3	79.9	79.5	79.1	78.7	78.3	77.7	77.1	76.5	75.9	75.3	74.7	74.1	CrL
AnC	Ankle circumference	23.5	23.5	24	24.5	25	25.5	26	26.5	27	27.5	28	28.5	29	29.5	30	AnC
HeC	Head circumference	55.2	55.4	55.6	55.8	56	56.2	56.4	56.6	56.8	57	57.2	57.4	57.6	57.8	58	HeC
Interna	ational women's sizes in	com	oariso	n													
Ger (Ge	ermany) 32	34	3	6	38		40	42		44	46	4	48	50		52	54

International S M M/L XL XXL XXL XXXL XXXL XXXL X۵ XXXL 8 UK (Great Britain) 10 12 14 16 18 20 22 24 26 28 -8 9 US (USA) 10 14 18 20 22 24 26 12 16 36 F (France) 38 40 42 44 46 50 52 54 56 58 _ 42 44 50 54 58 IT (Italy) 40 46 48 52 56 60 -9 11 13 15 17 19 21 23 25 Japan

Line types

In patternmaking, pattern pieces are designed on paper or digitally on a screen. The fabric is then cut with these pattern pieces. When sewn together, they form a garment, e.g. a skirt.

The lines are used to limit and divide these surfaces. They are therefore the elementary components of every pattern.

When creating patterns manually or when it comes to digital patterns, only one type of line is usually used - the solid line. For professionals, the significance of lines results from the context and the line position.

Use of various line types in this book

For a better understanding, different line types have certain meanings. Line types thus provide additional information:

1 Seam line ------

Dash lines normal which symbolise a seam or invisible edges (then with fine line).

2 Reference line

Design, measurement and extension lines are drawn as thin or bright full lines.

3 Cut line

The contours are drawn with a **wide full line**. The template or fabric is cut out along these lines.

4 Fold / break line _____

Folds and ironing edges are drawn with a dash and two-dots line.

5 Symmetry line — · — ·

As a central line, it indicates that there is the same size and shape of a pattern surface on both sides of the line (centre line). It is drawn as a **dash and dot line**.

6 Demonstration line

In this book, green **dotted lines** usually demonstrate the original (basic) pattern contour before the pattern is changed.

🕖 Design lines

or proportion lines indicate, for example, the breast, waist, hip, knee, elbow, outstretched arm lines etc. in pattern pieces. They are displayed with **long strokes and short spaces**.

8 Dimensioning lines + arrows ——

Green narrow or bright lines with arrowheads are dimensioning lines; as lines used for checking, they are mostly orange.

9 Pointing lines + arrows

They point to described places on the pattern.

Dimensions in this book

Lines and distances must very often have exact dimensions in a design. Not only these lengths, but also distances or curve lengths to be removed are marked with green values on the dimensioning lines (see at the bottom on point 8, P8). These can be real numerical values in cm, body measurements or previously calculated construction measurements which are sometimes provided with abbreviations. This abbreviation then stands for the calculated or measured numeric value in cm, which must then be marked or measured in the **direction of the dimensioning arrow** (for example, front dart length or HeAl).

Sometimes, due to lack of space or for reasons of clarity, some values are shown in small green figures (without **centi-metres**, which is the unit of length uniformly used in this book, refer at P8).

Checking: Front hip width (fHiW)

Design steps

12345

In this book, the respective design steps are described in a text next to the drawing for almost all designs. The sequence of the steps must always be complied with. This sequence of steps is illustrated by blue dots with white numbers both in the text and at the corresponding places on the construction drawings (see at the top - however, here they do not represent a sequence of steps, but ordinal numbers). This ensures quick and easy orientation during the designing process.

Sometimes the dots are displayed in other colours to distinguish different designs better on a double side.

Standards for patternmaking (2) Seam allowances, hems and facings

The production pattern

A model pattern is created from the **basic pattern** according to the model idea using various rules. This usually results in several pattern pieces for the model. The contours of the **model pattern** pieces are

- Seams (e.g. the side seam),
- 2 Edge (e.g. the hem edge) and
- Symmetry or break lines.

However, a **production pattern** for a model contains even more surface area, which are required befor cutting the fabric. These are seam allowances and hem allowances. Furthermore, it contains plenty of additional information for production.

Seams and seam allowances

The seam is a linear connection of several fabric pieces with one or more sewing threads.

• With a few exceptions, it always takes place within a fabric surface (never exactly at the cutting edge of the fabric).

5 Thus, the individual surfaces visible from the outside which form a textile product (e.g. a skirt), are mostly bordered by seams (but also by edges, e.g. the hem).

On these textile surfaces, a narrow fabric surface is added to the boundary where a seam is provided, which is known as the seam allowance. Only now it is even possible to make a seam.

7 The seam allowance is not visible on the finished product from the outside,

(3) it is rather visible on the inside of the product.

Finishing allowances and hems

At edges, this additional surface is called allowance, e.g. hem, pocket or slit allowance.

• The allowance is turned up (folded over) on the inside of the product and the desired edge is obtained by ironing.

However, hems are not visible from the outside.

(1) The seam allowances and hems (with a few exceptions) always run parallel to the respective seam or edge at a defined distance.

Facings

Pror a shaped edge, in contrast to a joined allowance, a separate pattern piece - the facing - is cut to size and sewn to this edge (folded). Facings are only visible from the inside of the product. They strengthen, fix and clean up the edge.



□1 Template of the basic skirt





□2 Model design of a short skirt with waist facings



Zi

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Hip skirt Back 2×-sy Fa

□ 3 Model pattern development

Until a model is ready for production, often several model patterns (first, second sample...) as well as several production patterns (prototypes) are created.

□5 Production pattern for the skirt model with seam allowances and hem allowances



Hip skirt Front 1×-sy Fa

□5 Cut-out of the skirt with the side seam and the hem. The side seam could be marked with chalk, hem with tacking thread.



Hip skirt fFc 1× Fa

 $\Box 6$ View of the side seam with the hem from outside and inside