made-to-measure
drafting system

This OPTIMASS Version 1 is a collaboration of the OPTIMASS group:

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The OPTIMASS group welcomes constructive criticism and suggestions for improvement.

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This is how OPTIMASS was created:
During the first excursion as a member of staff at the Fachhochschule Niederrhein (University for Applied Science), I visited a number of renowned clothing companies in East Westphalia with 22 young and dynamic students. Each company visit and especially the shared evenings brought lively discussions.
On the return journey, we were ensconced in a 'sleeve discussion' in which we came to the conclusion: we need a sleeve, a sleeve that fits every armhole, a sleeve that is as flexible as possible.
From that day on, Frau Arndt, Herr Bohnenkamp, Frau Wieloch and myself met once a week to puzzle over a sleeve in our spare time. We found the best basis in the Nattkemper and OPTIKON drafts.
Then, we recognised that a sensible sleeve needs a good flexible armhole.
The next realisation was that a good variable armhole naturally requires a particularly adaptable bodice block which can fulfil all the practical requirements. Therefore, we started work and devised an new basic bodice block. From the beginning, it was clear to us that this would only be possible with GRAFIS. Thetool GRAFIS allowed us to translate our findings very quickly and to test them in practice.And we tested and tried. The aims we set ourselves became ever more demanding. At times, we realised that we have to make compromises.
Now, the first version of OPTIMASS is finished and we introduce the variable skirt, the flexible trousers and the adaptable basic bodice block with the sleeve adjustable in every way. Furthermore, the two-piece sleeve, the unisex draft and the corsage are ready and available as programmes.
In the future, we will have a critical look at menswear, lingerie and childrenswear in order to achieve similar results.
I find the collaboration with the OPTIMASS Group very enjoyable and am very happy to have found motivated young people who follow and work on new goals with lots of idealism and commitment.

"Clothing technologist you are with your whole heart or not at all!"

Eva Hillers

Further areas of OPTIMASS drafts in process.
This page is reserved for an additional list of contents.

The OPTIMASS pattern system wants to achieve a draft with the highest possible certainty of fit. Therefore, OPTIMASS works with 41 measurements. The individual measurements can be used for full size draft on paper as well as computerised drafting with GRAFIS.

Detailed explanation of the procedures developed by OPTIMASS for determination of the body measurements can be found in the following pages. To ensure that the user can locate the points on the body from which the measurements are taken as accurately as possible, they are described as anthropometrical points in text and image.

The measurement chart on which OPTIMASS is based has two break sizes, 38 and 44. The grade rules for the sizes 32 to 38 are linear. Between sizes 38 and 40 the grade rule is not linear. Within the size group 38 to 44 the grade rules are linear, also and not linear to size 46. From size 46 to size 64 the grade is linear.

In practice, it is common to work with smaller increments in the smaller size group (32 to 38) than in the medium size group (38 to 44) and the larger size group (46 and above). Working with uneven grades is necessary to obtain a good fit. Only in this way is it possible to take into consideration the change of proportion of the body with growing size.

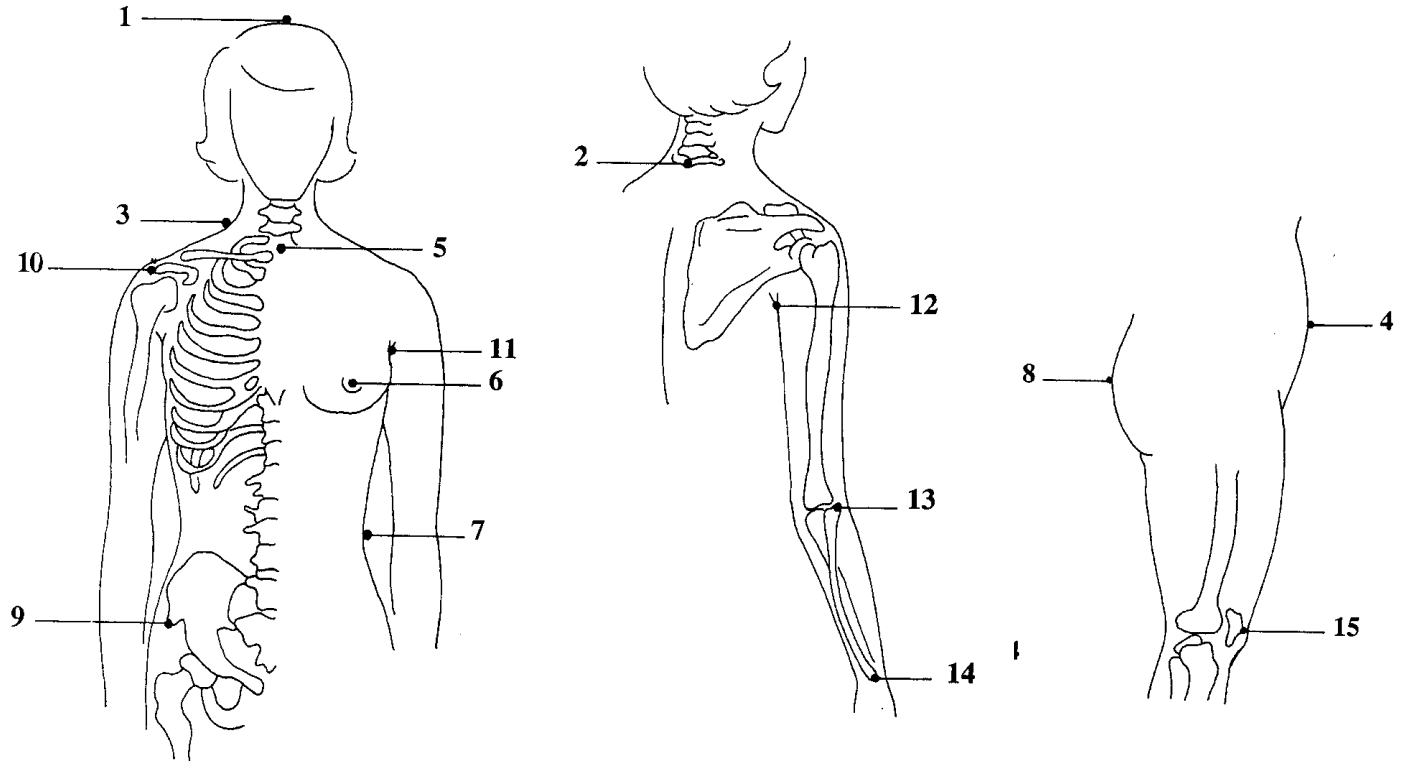
The values l Kö, l Se, l Sr, l Ge, l Si, u Br, u Ta,and u Ge are included in the measurement chart. The validity of these measurements was confirmed in test series.

The values HBT, HB, l Cu, l Sp, b Rü, b Ak, b Vo, b Ar, u Kp, u Br, u Ub, BA, Su, Ge and d Sp were developed in OPTIMASS based on new measurement results. Mathematical formulae were developed for their calculation. The validity of these values was confirmed in test series, also.

The values l Br, l Vo and l Su which OPTIMASS does not apply for reasons explained later, as well as the values l Ta, l Kn, l Oa, l Ar, u Oa, u Ha, u Ut, u Hg, u Os, u Kn, u Wa, u Fe and u Fr were calculated with the OPTIKON formulae on the basis of the new defined measurements mentioned above. A new calculation had to ensue as the measurements they were based on had changed.

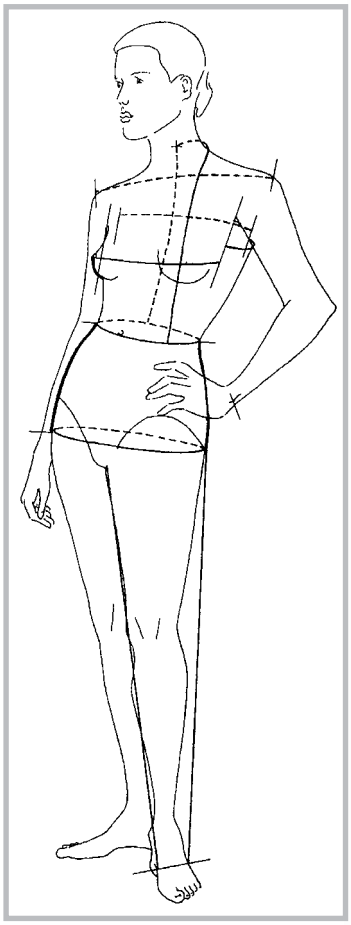
1. Landmarks on the Body

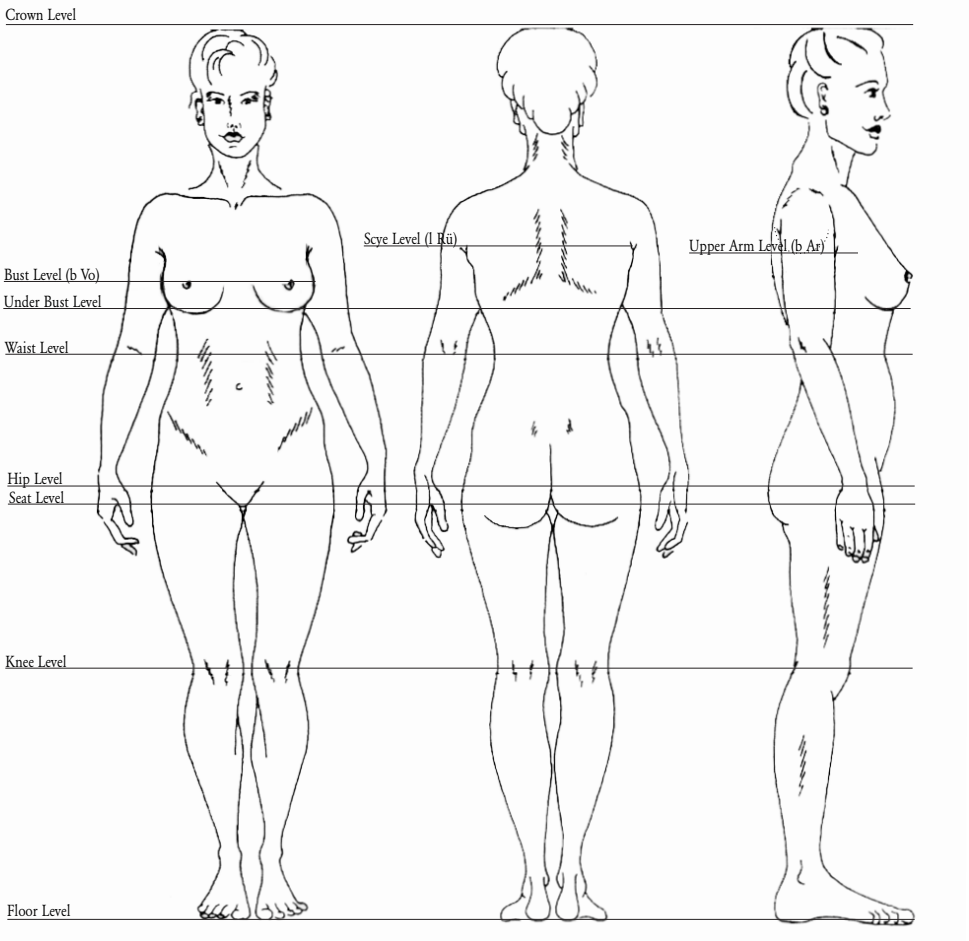
1.1 Anthropometrical Points



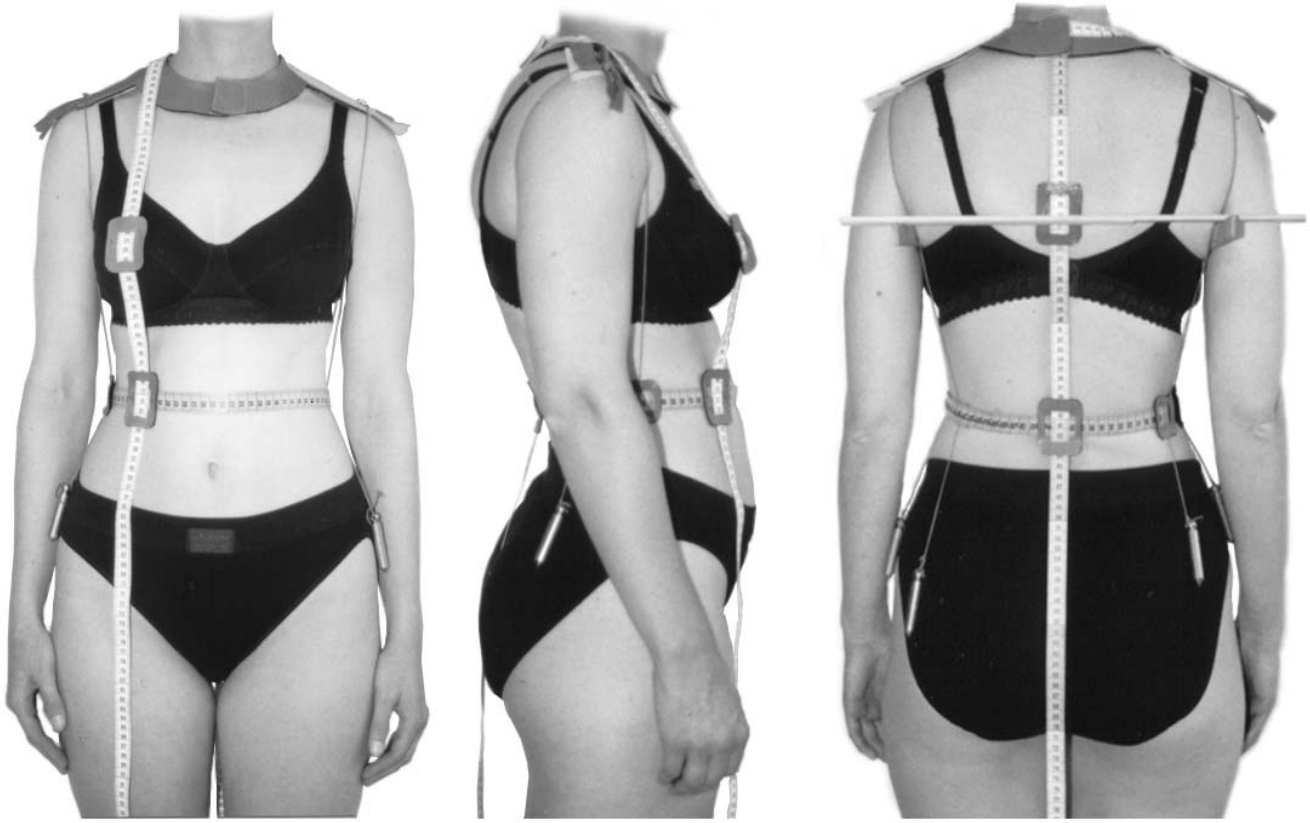
Quelle: DDR-Standard, Dez.1978(Berlin)
TGL 35892, Körpermaße

Measurement Point	Point No.	Explanation
Crown	1	Crown of the head when head is in horizontal eye-ear position
Nape	2	Spinous process at the seventh cervical vertebra
Neck Base	3	Intersection of base of neck line and shoulder line
Abdomen Vertex	4	Most prominent point of the abdomen
Upper Sternum Point	5	Point situated in the middle of the indent at the highest point of the sternum
Bust Point	6	For men the centre of the nipple; for women the most prominent point of the bust
Waist Point	7	Point at minimal girth at the side of waist
Seat Vertex	8	Greatest posterior prominence of buttocks
Pelvic Bone	9	Most prominent point of the pelvic bone
Acromion	10	Most prominent point of the acromion at the shoulder
Armscye	11	Highest point of the arc of the front armpit with hanging arms; mostly a fold of the flesh is visible
Back Flesh Fold	12	End point of flesh fold in the back
Elbow Point	13	Most prominent upper point of the elbow.
Carpus	14	Positioned below the wrist bone and is indicated by folds in the skin when bending the hand.
Knee Point	15	Centre of the kneecap



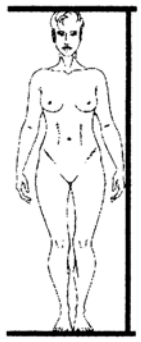
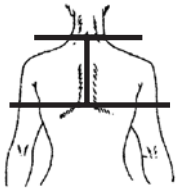
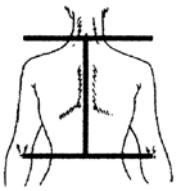
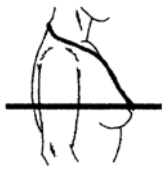
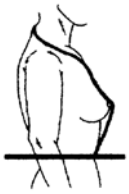
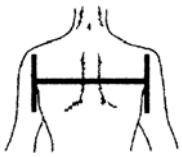
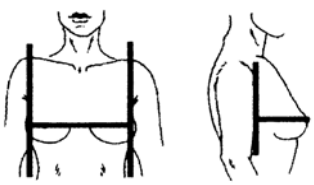


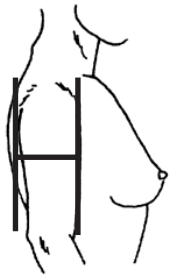
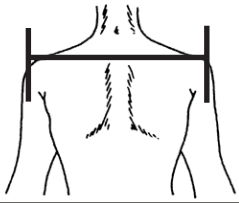
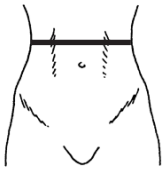
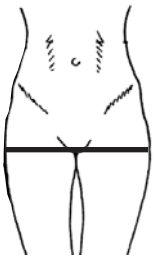
1.3 Photographic Illustration of Measurement Device

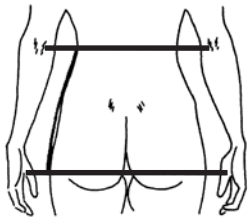
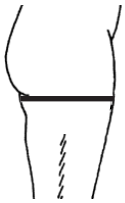
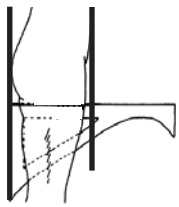
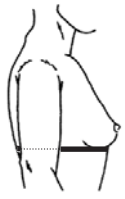


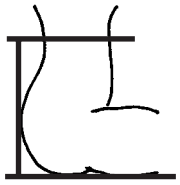
2. Measuring Technique

2.1 Definition and Illustration of Body Measurements

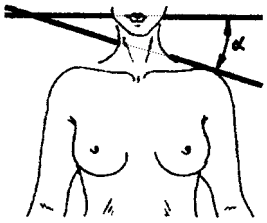
Measurement	Code	Measuring the Body	Illustration	g value
Height	l Kö	Vertical distance from crown (1) to floor level		g 3
Scye Depth	l Ac	Measured on the back, vertical distance from nape (2) to scye level		g 40
Nape to Waist Centre Back	l Ta	Measured on the back, vertical distance from nape (2) to waist level		g 5
Nape to Bust	HB	Distance from nape (2) measured on the body tightly along the neck base (3) over the shoulder to the bust point		g 30
Nape to Waist over Bust	HBT	Distance from nape (2) measured on the body tightly along the neck base (3) over the shoulder and the bust point to waist level		g 18
Across Back	b Rü	Distance measured horizontally across the back from back flesh fold (12) to back flesh fold (12) on scye level		g 7
VAcross Bust	b Vo	Distance measured horizontally across the body from the extended armscye line (11) across the bust point (6) to the opposite extended armscye line (11)		g 33

Measurement	Code	Measuring the Body	Illustration	g value
AScye Width	b Ar	Distance measured horizontally under the arm from the vertically extended back flesh fold (12) to the vertically extended armscye 12) b Ar is always approx. 1/3 of the upper arm girth		g 34
Upper Arm Girth	u Oa	Circumference measured on the thickest point of the upper arm, measured with the arm bent		g 14
Acromion Width	b Ak	Distance measured horizontally across the back from acromion (10) to acromion (10)		g 29
Arm Length	l Ar	Distance measured from acromion (10) over elbow point (13) to carpus (14), with arm relaxed at the side		g 13
Base of Neck	u Ha	Circumference measured at the base of the neck from nape (2) over neck base (3) to the front above the upper sternum point (5)		g 16
Waist	u Ta	Circumference measured around the narrowest point of the trunk at waist level		g 4
Hip	u Ge	Circumference measured horizontally at the most prominent part of the trunk. NB: for women this measurement can lie significantly below the seat vertex (8)		g 2

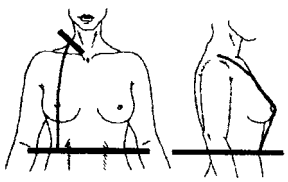
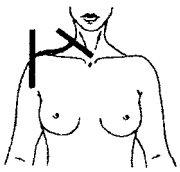
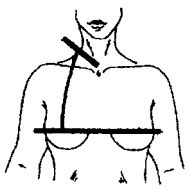
Measurement	Code	Measuring the Body	Illustration	g value
Waist to Hip	l Ge	Distance measured at the side of the body from waist level over the hip curve to the level of most prominent point below the waist (at hip level)		g10
Waist to Floor	l Se	Distance measured at the side of the body from waist level to floor level		g19
Inside Leg	l St	Distance measured at the inside of the leg from seat level to floor level		g20
Thigh Gith	u Os	Circumference measured horizontally at height of the most prominent point of the thigh		g 32
Abdomen-Seat Diameter	d Sp	Distance measured horizontally from abdomen vertex (4) to seat vertex (8)		g 35
Under Bust	u Ub	Circumference measured horizontally immediately below the bust at under bust level		g 28
Cup Depth	l Cu	Vertical distance from bust point (6) to under bust level measured along the bust, carefully following the contour		g 31

Measurement	Code	Measuring the Body	Illustration	g value
Crotch Length	l Sp	Distance measured at the centre axis of the body from front waist level through the legs to back waist level		g 36
Body Rise	l Si	Distance measured at the centre back of the seated body from waist level to seat level l Se - l Sr = l Si (Waist to Floor - Inside Leg = Body Rise)g8		g 8
Waist to Knee	l Kn	Distance measured at the side of the body from waist level to knee point (15)		g 9
Acromion to Elbow	l Oa	Distance measured along the arm from the acromion (10) to the elbow point (13)		g 12
Head Girth	u Kp	Circumference measured horizontally over the forehead and the most prominent point of the back of the head		g 27
High Hip	u Ut	Circumference measured horizontally around the body at pelvic bone height (9) approx. 8 cm below waist		g 22
Wrist	u Hg	Circumference measured at right anlge to the arm axis over the carpus (14)		g 15
Knee Girth	u Kn	Circumference measured horizontally around the leg at knee point (15)		g 39
Below Knee	u Uk	Circumference measured horizontally directly below the kneecap		g 23

2.1 Definition and Illustration of Body Measurements

Measurement	Code	Measuring the Body	Illustration	g value
Calf Girth	u Wa	Circumference measured horizontally over the most prominent point of the calf muscle		g 37
Ankle Girth	u Fe	Circumference measured horizontally around the leg directly above the ankle bone		g 38
Heel-Instep Girth	u Fr	Circumference measured horizontally over the most prominent point at the heel and the highest point of the instep		g 21
Bust Suppression Angle	α BA	This measurement is to be determined according to the matrix on page 15		
Shoulder Angle	α Su	The first line indicates the slope of the shoulder from neck base (3) to acromion (10). A second horizontal line intersects with the first line and the angle is determined. A standard angle of 22 ª is recommended. Practical tip: transfer lines to a wall or employ measurement device		g 25
Seat Angle	α Ge	This measurement is to be determined via the matrix on page 16. A standard setting of 6 ª for women and 7-12 ª for men is recommended		g 26

2.2 Common Measurements NOT used by OPTIMASS

Measurement	Code	Measuring the Body	Illustration	Reason
Neck to Waist over Bust	l Vo	Distance measured along the body from neck base (3) over the bust point (6) verticall y to waist level		Neck base is difficult to determine and inaccurate. Therefore, measurement discrepancies occur.
Shoulder Length	l Su	Distance measured along the body from neck base (3) to acromion (10)		
Neck to Bust	l Br	Distance measured along the body from neck base (3) to bust point (6)		

2.3 Matrix for Determination of Bust Suppression Angle

100% of angle
high bust point
rounded posture

133% of angle
high bust point
normal posture

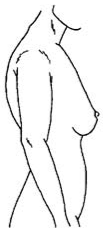
150 % of angle
high bust point
straight posture

50 % of angle
centred bust point
rounded posture

100% of angle
centred bust point
normal posture

125% of angle
centred bust point
straight posture

25% of angle
low bust point
rounded posture



66.6% of angle
low bust point
normal posture

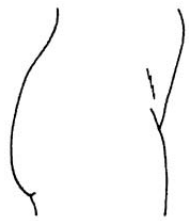
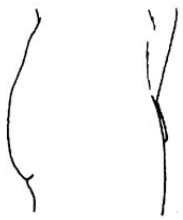
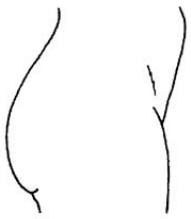
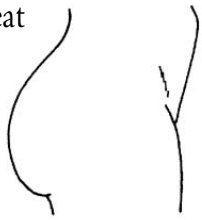
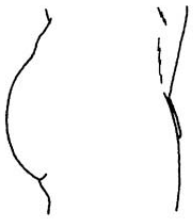
100% of angle
low bust point
straight posture

2.4 Table for Bust Suppression Angle

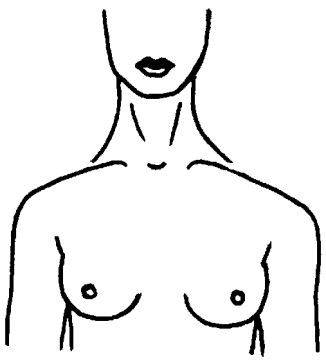
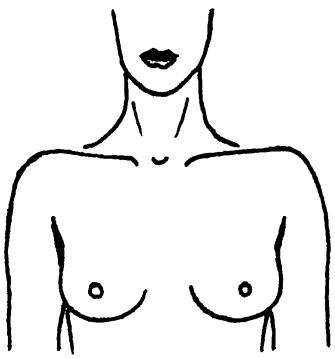
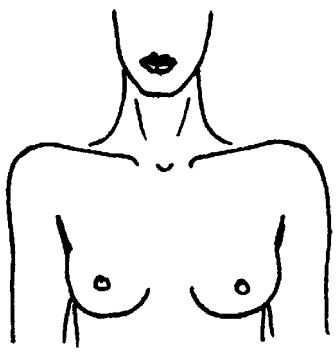
Size	Cup A 50 %	Cup B 75 %	Cup C 100 % (g24)	Cup D 125 %	Cup E 150 %
32	5,50°	8,25°	11,0°	13,75°	16,50°
34	6,00°	9,00°	12,0°	15,00°	18,00°
36	6,50°	9,75°	13,0°	16,25°	19,50°
38	7,00°	10,50°	14,0°	17,50°	21,00°
40	7,75°	11,63°	15,5°	19,38°	23,25°
42	8,50°	12,75°	17,0°	21,25°	25,50°
44	9,25°	13,88°	18,5°	23,13°	27,75°
46	10,25°	15,38°	20,5°	25,63°	30,75°
48	11,25°	16,88°	22,5°	28,13°	33,75°
50	12,25°	18,38°	24,5°	30,63°	36,75°
52	13,25°	19,88°	26,5°	33,13°	39,75°
54	14,25°	21,38°	28,5°	35,63°	42,75°
56	15,25°	22,88°	30,5°	38,13°	45,75°
58	16,25°	24,38°	32,5°	40,63°	48,75°
60	17,25°	25,88°	34,5°	43,13°	51,75°
62	18,25°	27,38°	36,5°	45,63°	54,75°
64	19,25°	28,88°	38,5°	48,13°	57,75°

The following increments are determined for grading a C cup: sizes 32 to 38 = 1°
sizes 38 to 44 = 1.5°
sizes 44 to 64 = 2°

2.5 Matrix for Determiantion of Seat Angle

Sketch Womenswear		Sketch Menswear	
flat seat 	up to 2°	flat seat 	up to 4°
normal seat 	6°	normal seat 	8°
prominent seat 	up to12°	prominent seat 	up to18°

2.6 Matrix for Determination of Shoulder Angle

sloping shoulders	normal shoulders	raised shoulders
		
24°	22°	18°

Name:		Customer No.	
Adress:		Telephone:	
		Fax:	
generated:		edited:	

		Bodice	Trousers	Skirt	Unisex	g value	Measurement
1 Ac	Scye Depth					g 40	
1 Ta	Nape to Waist CB					g 5	
HB	Nape to Bust					g 30	
HBT	Nape to Waist over Bust					g 18	
b Rü	Across Back					g 7	
b Vo	Across Bust					g 33	
b Vo o	Across Chest					control measurement	
b Ar	Scye Width					g 34	
u Oa	Upper Arm Girth					g 14	
b Ak	Acromion Width					g 29	
1 Ar	Arm Length					g 13	
u Ha	Base of Neck					g 16	
u Ta	Waist					g 4	
u Ge	Hip					g 2	
l Ge	Waist to Hip					g 10	
l Se	Waist to Floor					g 19	
l Sr	Inside Leg					g 20	
u Os	Thigh Girth					g 32	
d Sp	Abdomen-Seat Diameter					g 35	
u Ub	Under Bust	Corsage				g 28	
l Cu	Cup Depth	Corsage				g 31	
α BA	BABust Suppression Angle					g 24	
α Ge	GeSeat Angle					g 26	
α Su	SuShoulder Angle					g 25	

Figure Analysis:

Hip Shape		Seat Shape		Posture	
normal		normal		normal	
flat		flat		straight	
prominent		prominent		rounded	

Other Posture Deviations:

The OPTIMASS basics for construction are demanding for the user. First, you have to learn about the system, as without specialist knowledge errors may occur in the construction instructions. Note:

THE MOST IMPORTANT THING IS TAKING THE MEASUREMENTS!!!

Taking measurements is the most difficult chapter of alland some experience and talent for observation regarding the variety of human figures is required. The person to be measured should be measured wearing foundation garments. Alternatively, it is recommended to wear a black body for making construction levels and lines visible with tailor's chalk.

Secure measurement taking is ensured through use of the measurement device developed, especially (see page 9).

As a matter of principle, the figure should be looked at in your own time before taking the measurements. This 'learning to see body shapes' is an absolute must for every pattern specialist. As a rule, this interpretation is cut short when taking measurements as an educated eye can absorb a number of characteristics of a figure. Dispensing with this thorough viewing leads to a large number of alteration during fittings.

Circumspect taking of measurement is recommended. Beginners, especially should take a lot of time.

First, the waist line is to be fixed with a waistband or similar.

l Ac The scye depth is measured with rulers inserted horizontally under the armpit. A ruler based onto these at the back indicates the distance from nape (2) to scye level.

l Ta After having removed the rulers continue measuring nape to waist centre back downwards to the middle of the waistband.

HB HBT From the nape, measure down the front to the bust point and then onto the centre of the waistband. The tape measure is to be guided tightly along the base of the neck. As errors occur easily, this measurement should be taken with extra care. Ensure that the measurement is taken exactly along the base of neck in the back over the highest point of the neckline.

To take the width measurements the armscye lines in front and back must be made visible. This requires some experience. When using the measurement device the plumbline tapes are placed behind the waistband and guided exactly in the flesh fold front and back (11/12). Note that the tapes run visually parallel to the centre axis of the body. Thus, the construction grid is transferred onto the body.

b Rü Now, measure across back from flesh fold to flesh fold. Note that the measurement is always taken above the scye level. Subsequently, in the construction it is not measured at scye level but at the point where the measurement has actually been taken

b Vo The most difficult measurement to be taken is the complete acrossbust measurement. It is measured from armscye to armscye at bust point height. It is imperative to ensure a straight optic of the lines to the centre axis of the body. This results in the distance between the armscyes at waist level being smaller than the distance at armscye level.

b Ar The scye width is measured tightly from back armscye through the armpit to front armscye. The arm should not be pressed against the body. Taking this measurement requires some experience and the upper arm girth should always be measured at the same time as a control measurement.

u Oa With this measurement conclusions about the scye width can be drawn: the upper arm girth equals approximately 1/3 of the upper arm girth.

Adding the taken measurements ½ across back + scye width + ½ across bust the result is usually larger than half of the bust measurement because of having taken the measurements at the respective levels. The bust measurement is not used in the bodice block programme. In womenswear a more masculine figure type (with wide prominent shoulders and back) can be found as well as the particularly feminine type (with large bust volume and narrow back); and the bust measurement does not give any information about the figure type. The aim of OPTIMASS is to do justice to each figure type, which is why width measurements are taken in this way. At this point the across chest measurement should be taken for control (horizontally from flesh fold to flesh fold at the front armscyes). This measurement is checked later in GRAFIS at the bodice block without ease. If discrepancies occur, across bust, the bust suppression angle and the across chest measurement should be checked again.

b Ak The acromion width measurement is taken horizontally across the whole back from acromion to acromion. The acromion (10) can be felt at the shoulder; it is the small ball point at the shoulder bone. From this point continue measuring, without lifting off the tape measure, over the elbow (13) to the carpus (14). From this complete measurement, you obtain the arm length by subtracting the acromion width. Placing the tape measure a second time is omitted to avoid inaccuracies.

u Ha The base of neck is measured along the neck base. The nape (2), neck base (3) and upper sternum point (5) are used for orientation.

u Ta The waist is measured at the hollowest point of the waist.

u Ge The hip (most prominent point in the hip area) is not always measured at seat vertex height. Therefore, after close observation, it hasto be measured in various places to find the actual most prominent point. For example, when wearing a loose skirt or similar during measurement taking, the most prominent point of the hip is hidden and the hip measurement taken can be too small.

l Ge When the hip height has been located and fixed, the waist to hip measurement can be taken, next so that the most prominent point of the pattern can subsequently be placed exactly at this height. Seat and hip curves should be observed, carefully when viewing the figure to conclude type and number of the darts. Is the figure low and round at the seat or wide and flat, the corresponding darts and back reduction are decided. (If required,take the depth of the hollow of the back, also.)

αBA Lastly, determine the angles. In the measurement chart, the normal medium angle for the respective size is considered for the bust suppression angle. Is the bust volume larger than normal, the angle is to be increased, is the volume smaller (boyish figure) the angle can be reduced. Additionally, the body posture is taken into account when determining the bust suppression angle. If the figure stands very straight and upright in comparison to the normal figure, the angle is increased. Is the posture bent forward, the angle can be reduced even for normal bust volume on the basis of the posture alone. Refer to the matrix on page 15 for advice.

αSu The angle for normal body posture g is 22ª and is ° the basic setting for all sizes in the Massquell.urm (GRAFIS internal). A measurement device for determining this shoulder angle on he body is available (for more explanation see the OPTIKON book). If this device is not available evaluate the shoulder angle on the body. For normal shoulder slope the g value of the angle in the chart should not be altered. For shoulders with a strong slope, the angle is to be increased, for very straight shoulders, the angle is to be reduced. Refer to the matrix on page 16 for advice.

αGe The basic setting for a normal seat shape is 6ª for all sizes. The seat ° volume is decisive for the size of the angle. For a prominent seat the angle is to be increased, for a flat seat the angle is to be reduced. The angle can also be increased for more comfort. Refer to the matrix on page 16 for advice.

The application of OPTIMASS

On the previous measurement sheet the succession of the body measurements to betaken is chosen to allow you to follow the order of measurement taking, introduced above.The more thorough and more accurately the measurements are determined, the better the fit of the basic block.

STAGE 1: BASIC BLOCK

The g values are to be entered into the individual measurement chart and to be edited according to the actual measurements taken. For the following check of the bodice block with the individual measurement chart no proportion classes are to be added to the grading chart, as these do not apply to OPTIMASS. The basic block shown should be examined carefully to help you learn to visualise the respective figure by looking at the basic block. This will require some practice and once mastered will show you as a competent professional.