OPTIMASS

All in One



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1 Introduction

The OPTIMASS measurement system incorporates 49 body measurements.

The measurement charts for womenswear, menswear, childrenswear and underwear employed in OPTIMASS use different break sizes and size increments depending on the figure type.

Womenswear:

eference is the bust	
in sizes 30 to 38	by 3cm
in sizes 38 to 44	by 4cm
in sizes 44 to 54	by 6cm
in sizes 54 to 70	by 8cm
•	eference is the bust in sizes 30 to 38 in sizes 38 to 44 in sizes 44 to 54 in sizes 54 to 70

Menswear:

3 figure types, sizes 40 to 78, reference is the bust. The <u>bust</u> changes in sizes 40 to 72 by 4cm continuously.

Childrenswear:

2 figure types, size 50 to size 180, reference is the height. The <u>height</u> changes in sizes 50 to 180 by 6cm continuously.

Underwear - bras:

7 figure types Cup A to Cup G, reference is the under bust. The <u>under bust</u> changes in sizes 60 to 140 by 5cm continuously.

Today, more emphasis is given to proportional changes of the body throughout the sizes in womenswear. It is common to grade smaller sizes (30 to 38) with smaller increments than larger sizes.

According to German body measurement norm, 90% of German women have a height of 1,53m to 1,72m. In order to capture more than 90% of women, an extra-long and an extra short size has been developed. The norm (Deutsches Institut für Normung 33402-2 – German Institute for Norms) furthermore states that height has remained unchanged in the last 10 years

In menswear, the reference is always the bust. It is graded with a continuous increment of 4cm in sizes 40 to 78. The various figure types are distinguished through a different front waist width in relation to the bust. The height is usually graded by 2cm from size to size throughout the figure types.

2 Landmarks on the Body

Anthropometrical Points



Picture 1 Anthropometrical Points

Measurement Point Designation	Point	Explanation	
Crown	1	Crown of the head when ears and eyes are level.	
Nape	2	Spinous process at the 7th cervical vertebra.	
Neck Base	3	Intersection of base of neck line and shoulder line.	
Abdomen Apex	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 the waist.	
Seat Apex	8	Greatest posterior prominence of the buttocks.	
Pelvic Bone	9	Greatest anterior prominence of the hip bone.	
Acromion	10	Lateral acromion point of the shoulder.	
Armscye	11	Highest point of the arc at the front armpit while arms are hanging, often indicated by a skin fold.	
Back Skin Fold	12	End point of skin fold in the back.	
Elbow	13	Most prominent upper point of the elbow.	
Carpus	14	Positioned below the wrist bone, indicated by skin folds when bending the hand.	
Knee point	15	Centre of the kneecap.	

Body Measurement Lengths and Body Levels



Picture 3: Men's Body Levels

3 Body Measurements

3.1 Definition and Illustration of Body Measurement Lengths

No	Measuremen t	Measurement on the Body	Illustration
G01	Height I Kö	Vertical distance from the crown (1) to the floor.	
G02	Bust u Br	Horizontal circumference across the most prominent point of the bust level (6). only as control measurement	back front
G03	Waist u Ta	Horizontal circumference around the narrowest point of the torso at waist level.	back front
G04	High Hip u Ut	Horizontal circumference around the torso at level of pelvic bone (9), approx. 8 cm below the waist.	back front



No	Measuremen t	Measurement on the Body	Illustration
G05	Hip u Ge	Horizontal circumference around the largest point of the torso at hip level (8).	back front
G06	Scye Depth I Ac	Length from 7th vertebra (2) to scye level.	
G07	Nape to Waist Centre Back I Ta	Length from 7th vertebra (2) to waist level.	
G08	Waist to Hip I Ge	Length from lateral waist level across hip curve to most prominent point but not below seat level.	
G09	Bust Depth l Br	Length from highest shoulder point (3) to bust point (6).	
G10	Neck to Waist over Bust I Vo	Length from highest shoulder point (3) via the bust point (6) to waist level.	



No	Measuremen t	Measurement on the Body	Illustration
G11	Nape to Bust 7 HB	Length starting at 7th vertebra (2) tight along the base of the neck (3) across the shoulder to the bust point (6).	
G12	Nape to Waist over Bust 7 HBT	Length starting at 7th vertebra (2) tight along the base of the neck (3) across the shoulder and the bust point (6) to the waist.	
G13	Across Back	Width from skin fold (12) to skin fold (12) measured <u>horizontally</u> across the back. The optimum measuring level for this measurement is at 3/4 of scye depth I Ac .	front back
G14	Acromion Width b Ak	Width from acromion point to acromion point (10) measured horizontally across the back.	
G15	Shoulder Length I Su	Length from base of neck (3) to acromion shoulder point (10).	
G16	Scye Width b Ar	Distance measured horizontally below the arm from the vertical extension of the skin fold (12) to the extended armscye (11).	back front
		b Ar usually equals 1/3 of upper arm girth u Oa .	

No	Measuremen t	Measurement on the Body	Illustration
G17	Across Bust b Vo	Width measured <u>horizontally</u> from one extended armscye line (11) to the other armscye line across the bust point.	back front



No	Measuremen t	Measurement on the Body	Illustration
G18	Bust Suppression Angle wi BA	Angle between the connection of bust point to base of neck and the vertical from the bust point. Further information follows on pages 15 and 16.	
G19	Shoulder angle wi Su	Angle between the connection of acromion point to base of neck and the horizontal from the base of neck. Further information follows on page 17.	
G20	Base of Neck u Ha	Circumference of the base of neck running across the 7th vertebra (2) and the neck base point (3).	
G21	Front Waist Width Menswear b Le	This measurement is required for menswear and childrenswear, only! Width from the extended armscye line (11) to the other armscye line measured across the waist.	
G22	Upper Across Bust b Vo o	Minimum width above the bust from skin fold (11) to the other skin fold.	back



No	Measuremen t	Measurement on the Body	Illustration
G23	Distance Bust Point - b Vo o Abst	Distance between the bust level and the level for measuring the upper across bust width bVoo .	
G24	Arm Length I Ar	Length from acromion shoulder point (10) via the elbow (13) to the carpus (14), measured in natural posture.	
G25	Acromion to Elbow I Oa	Length from acromion shoulder point (10) to the elbow (13), measured in natural posture.	
G26	Upper Arm Girth u Oa	Circumference around the largest point of the upper arm, measured with arm angled.	
G27	Wrist u Hg	Circumference of the wrist (14).	
G28	Head Girth u Kp	Circumference of the head, measured across the forehead and the most prominent point at the back of the head.	



No	Measuremen t	Measurement on the Body	Illustration
G29	Waist to Floor	Length from waist to floor, measured along the side of the torso.	
G30	Body Rise	Length from waist to seat level, measured along the side of the torso. I Se – I Sr = I Si	
G31	Inside Leg I Sr	Vertical distance between the seat level and the floor, measured on the inside of the leg.	



No	Measuremen t	Measurement on the Body	Illustration
G32	Waist to Knee I Kn	Length from the waist level to knee level (15), measured along the side of the body.	
G33	Seat Angle wi Ge	Angle between connection from the thigh to the seat apex and the horizontal from the thigh. Typical values: women: 4° to 12° men: 5° to 18° Further information on page 17.	
G34	Abdomen- Seat Diameter d Sp	Horizontal distance from abdomen apex (4) to seat apex (8), through the body.	
G35	Crotch Length	Length from waist level front to waist level back, measured through the crotch.	



No	Measuremen t	Measurement on the Body	Illustration
G36	Thigh Girth u Os	Horizontal circumference of the thigh, measured at the largest point.	
G37	Knee Girth u Kn	Horizontal circumference of the knee (15).	
G38	Below Knee u Uk	Horizontal circumference immediately below the knee cap.	
G39	Calf Girth u Wa	Horizontal circumference of the calf, measured at the largest point.	
G40	Ankle Girth u Fe	Circumference of the leg above the ankle.	
G41	Heel- Instep – Girth u Fr	Circumference measured across the heel and the instep.	



No	Measuremen t	Measurement on the Body	Illustration
G42	Under Bust u Ub	Horizontal circumference below the bust.	back front
G43	Cup Length I Cup	Length from bust point (6) to under bust level.	
G44	Cup Diameter b Cup	Bust width <u>without bust</u> <u>volume</u> , measured through the body.	back front
G45	Cup Width w Cup	Bust width <u>with bust</u> <u>volume</u> , measured along the body.	back
G46	Bridge Width at CF b Steg	Distance between base of bust and base of bust at bust point level.	back front
G47	Bridge Height at CF h Steg	Distance between bust point level and base of bust level, measured at the centre front.	



No	Measuremen t	Measurement on the Body	Illustration
G48	Base of Bust to Waist h Ba	Distance from under bust level to waist.	
G49	Cup Depth z Bt	Distance between bust point and torso, measured through the body.	back front



3.2 Determination and Correction of the Bust Suppression Angle

The bust angle can also be calculated via:

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wi BA = (b Vo – b Vo o)/(Abst * Pi) * 90°
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G18 = (G17 – G22)/(G23 * Pi) * 90°

Depending on the posture, a further factor can be adjusted in the basic construction:



Picture 4: Correcting Factor for Bust Suppression Angle



Picture 5: Posture and Bust Point



cross section cross section womenswear menswear back back flat 4° 5° posterior normal posterior 6° 8° prominent posterior up to 12° up to 18° front front

3.3 Determination of Seat Angle

Picture 6: Seat Angle

3.4 Determination of Shoulder Angle



Picture 7: Shoulder Angle



3.5 Determination of Hip Shapes

The hip shape is required for selection of the appropriate figure type:



Picture 8: Hip Shapes



4 Explanations on Taking Measurements

Taking measurements requires practice and observational skills regarding the diversity of human figures in everyday life. Clothing experts obtain a lot of information from observing people and the human body. The subjects should, if possible, be measured wearing under garments; a black elastic body is ideal to visualise construction levels and lines with tailor's chalk.

A device especially developed for taking measurements can also be used (pages 29 - 33).

The practitioner always regards the body from the front, the back and the side calmly and with expertise. ,Learning to see body shapes' is a must for every pattern expert.

A photo with three different views is always recommended and a great help in comparing and confirming the silhouette with the basic pattern.

Frequently, insufficient time is given to taking and interpreting measurements; but a trained eye will envisage the variations to be expected in the pattern. Dispensing with close observation results in a greater number of alterations during fitting.

Taking measurements is the most important element!!!

4.1 Chronological Order for Taking Measurements for a Bodice

First, the <u>length measurements</u> are taken. The waist measuring tape is secured with a hook and a further measurement tape is used for taking the measurements. The subject holds a ruler under the left and right arm respectively. The arms should not squeeze the rulers but hold them loosely at the scye level.

Verify that the waist level is straight; you need a little distance to the subject to check this.

Measure ment	Comment	Picture	Value in size 38
l Ta G07	First, secure the waist line with a waist measurement tape with hook. The subject should feel whether this is the desired waist level. Measure from the 7th vertebra to the waist.		40 – 42cm
I Ac G06	The subject holds two rulers with the left and right arms. The rulers should not be squeezed tight but held loosely at scye level. Measure from the 7th		18,5 – 20cm

vertebra to the scye.



Measure ment	Comment	Picture	Value in size 38
l Ge G08	Measure the length from the waist along the side across the hip curve to the largest point, but not across the seat level. Observe the posterior and the hip curve to recognise the largest point. This information is important for made-to- measure to specify dart suppression and side seam reduction.		19 – 23cm
l Br G09	Measure from the highest shoulder point to the bust point.		28 – 29 cm
I Vo G10	Measure from the highest shoulder point (3) via the bust point (6) to the waist.		43 – 45 cm (for l Ta = 41cm)
7 HB G11	Measure length starting at the 7 th vertebra (2), tight along the neck base (3), across the shoulder to the bust point (6). Check the balance between front and back length to avoid the resulting garment protruding at the front or the back. Sometimes, standard measurements are useful to identify the deviation from the norm.		35 – 36 cm
7 HBT G12	as above, continue measuring to the waist.		50 – 52 cm



Value

in size 38

37 – 39 cm

Measure	Comment
ment	

b Ak

G14

Measure the width from acromion point (10) to acromion point <u>horizontally</u> across the back.

The acromion point can be felt at the shoulder; it is the small ball point on the shoulder bone. Measure the length from

I Ar Measure the length from
G24 acromion point (10) via the elbow (13) to the carpus (14), measured in natural posture.
Guide the measurement tape across the elbow to the carpus to measure the sleeve length.

In practice, the value ½ b Ak + I Ar is used as a control measurement for "half centre". The "half centre" can later be measured on the piece. It is approx. 78 to 82cm in size 38, more for coats and less for narrow tops.

u Oa Measure the circumference
G26 around the largest point of the arm, measured at bent arm. This measured measurement can be used for control of the measured scye width. The scye width bAr corresponds roughly to 1/3 uOa.

Picture



60 – 62 cm

27 – 29 cm

Now, the <u>width measurements</u> are taken. The visible scye lines front and back are important for taking these measurements. Recognising these lines requires practice. If the subject wears a body, the lines can be marked with tailor's chalk. A construction grid emerges. The skin folds visible at the arms front and back specify the width measurements to be taken.



Measure ment	Comment	Picture	Value in size 38
b Rü G13	Measure the width from skin fold (12) to skin fold (12) <u>horizontally</u> across the back. The optimum level for taking this measurement is at 3/4 scye depth I Ac. The across back measurement b Rü plus ease for comfort is used as a control measurement in practice and can be	front back	35 – 37 cm
b Ar G16	measured on the piece. Measure the distance between downward extended back skin fold (12) and extended scye line (11) horizontally below the arm. b Ar is usually 1/3 of upper arm girth u Oa. This measurement can be taken with a ruler instead of a measurement tape.	back front	9 – 10 cm
b Vo G17	Measure the width from the extended scye line (11) to the other scye line <u>horizontally</u> across the bust point.	back front	36 – 37 cm

The width measurements b Rü, b Ar and b Vo are measured at different levels! Therefore, the sum of these three width measurements is <u>greater</u> than the horizontally measured bust circumference! The bust circumference is used for control purposes.



Picture 9: Levels b Vo, b Rü, b Ar for Women and Men



Picture 10: Levels b Vo, b Ar, b Rü, on Body Cross Section and Bodice



Measure ment	Comment	Picture	Value in size 38
b Vo o G22	Measure the smallest width above the bust from skin fold (11) to skin fold. This measurement is used as a control measurement in practice	back front	32 – 34 cm
Abst G23	And can be measured on the piece. Measure the distance between bust level and the level for measuring upper across bust bVo o. This value is greater with larger bust volume.		9 – 11 cm
u Ha G20	Measure the circumference of the base of the neck across the 7 th vertebra (2) and the neck base point (3).		36 – 37 cm
u Ta G03	Measure the horizontal circumference around the smallest part of the torso at waist level. As the waist measurement tape is always pulled too tight, add 2 to 4cm.	back front	72 – 74 cm
u Ge G05	Measure the horizontal circumference around the largest part of the torso at hip level (8). The hip circumference is not always measured at seat vertex height. An experienced observer will measure at a number of points to be certain of having identified the largest circumference of the hip. Wearing a flared skirt when being measured is not practical as the most prominent circumference of the body cannot be determined with certainty.	back front	96 – 98 cm
wi BA G18 © DiplIng	Measure the angle between the connection of bust point to base of neck and the vertical from the bust point. Further information follows on pages 15 and 16. Particular attention must be paid to the bust angle: bust volume, posture and bust point height Eva Hillers. Senior expert womenswear m	enswear, childrenswear and und	15 – 17° erwear 2 ¹
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define the angle. If the bust volume is larger than normal, the angle must be increased and vice versa. If the subject has a very straight posture, the angle can also be increased and vice versa. If the bust point is high in relation to the highest shoulder point, the angle can be increased and vice versa.

wi Su

Measure the angle between the G19 connection of shoulder point to base of neck and the horizontal from base of neck.

Further information on page 17.

The angle is usually between 21 to 23 degrees. If the neck gapes, the angle is too large. If the armhole gapes at the shoulder, the angle is too small.

There are useful apps for measuring shoulder the angle with а smartphone, e.g. 'iLevel'.

21 – 23°

wi Ge Measure the angle between the G33 connection of thigh to seat apex and the horizontal from the thigh. Typical values: Women: 4° to 12° Men: 5° to 18°

Further information on page 17.

4.2 Chronological Order for Taking Measurements for Trousers

First, the length measurements are taken. The waist measurement tape is secured with a hook and a further measurement tape is used for taking measurements. Verify that the waist level is straight. A little distance to the subject is required to check this.

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Measure ment	Comment	Picture	Values in size 38
I Se G29	Measure the length from the waist to the floor along the torso.		106 cm
I Sr G31	Measure the vertical distance from the seat level to the floor on the inside of the leg.		78 cm
I Si G30	Measure the length from the waist to seat level along the side of the torso. I Si = I Se – I Sr		28 cm



Measure ment	Comment	Picture	Value in size 38
I Ge G08	Measure the length from waist level across the hip curve to the largest point along the side of the torso, but not across the seat level. When constructing the trousers, the hip level is usually positioned at 2/3 I Si from waist level.		
l Kn G32	Measure the length from waist level to knee level (15) along the side of the body.		61 – 62 cm
u Ta G03	Measurethehorizontalcircumferencearoundthe smallestpart of the torso at waist level.Assubjectstendtopullinstomach, alwaysadd 2 to 4 cm.	back	72 cm
w Ta	Measure the horizontal circumference at waistband height as a finished measurement. The position of waistband level is fashion-dependent.	Υ 10 <i>Γ</i>	
u Ut G04	Measure the horizontal circumference around the torso at hipbone height, approx. 8cm below the waist.	back front	
u Ge G05	Measure the horizontal circumference around the largest point of the torso at hip level (8).	back front	
u Os G36	Measure the horizontal circumference around the thigh at its largest point. As a rule, the largest point is located approx. 2cm below thigh level.		57 – 59 cm



Measure ment	Comment	Picture	Value in size 38
u Kn G37	Measure the horizontal circumference around the knee (15). In practice, the knee width is usually defined as a finished measurement as it is strongly fashion-dependent. In practice, the hem width is another finished measurement. If the hem width is smaller than the heel-instep girth, vents or zips must be incorporated.		
wi Ge G33	Measure the angle between the connection from thigh to seat apex and the horizontal from the thigh. Typical values: Women: 4° to 12° Men: 5° to 18° Further information on page 17.		6°
d Sp G34	Measure the horizontal distance from abdomen apex (4) to the seat apex (8) through the body. To measure the abdomen-seat diameter on the body, the operator needs some practice, see image. The L-square in the crotch is important. Alternatively, the abdomen-seat diameter can be calculated as follows: <u>1/6 hip uGe + 1 cm</u> (for central Europe).		17 cm
'Trouser fit is and will remain a philosophy'			



5 Presentation of the Measuring Harness

Picture 12: Womens Size Germany Tailor's Dummy, Front and Back View



Picture 13: Womens Size Germany Tailor's Dummy, Side View © Dipl.-Ing. Eva Hillers, Senior expert womenswear, menswear, childrenswear and underwear 30



Picture 14: Mens Size Germany Tailor's Dummy, Front and Back View



Picture 15: Mens Size Germany Tailor's Dummy, Side View

Materials Required



Picture 16: Materials for Manufacturing the Measuring Harness

- Leather or strong material for the neck rings, connectors and reading aides (approx. 30 x 45 cm)
- 2 zips (approx. 16 cm long)
- Velcro (approx. 10 15 cm)
- 2 measurement tapes
- 1 5 waist measurement tapes with hooks (min. one for the waist)
- String or ribbon (3 m)
- 4 weights for the string
- 3 narrow wooden batons (approx. 40 cm long)

Pattern Development and Pattern Pieces



Picture 17: Connectors and Reading Aide



Picture 19: Pattern Pieces for the Neck Ring



Preparation and Cutting

- Cut the pattern pieces for the neck ring, see Picture xx
- Cut reading aide x 2
- Cut connector x 4
- Cut Velcro approx. 7 10 cm
- Cut string 2x 150 cm
- Measurement tape: cut off the first centimetre, then notch the centimetre marks up to the ninth centimetre

Production

- 1) Insert zips into the openings at the back neck ring.
- 2) Place the front left and the front right neck ring under the back neck ring and connect with a quilting seam.
- 3) Attach the Velcro at the centre of the front neck ring.
- 4) Sew the measurement tape to the Centre Back.
- 5) Position the notched measurement tape to the outside of the first measurement tape and stitch along the neck up to the tenth centimetre line.
- 6) Pull the strings through the zip pulls.
- 7) Mount a reading aide onto the measurement tape in the centre back and then mount a large connector.
- 8) Pull the waist measurement tape first through two small connectors, then through the large connector already mounted on the back measurement tape and finally through two further small connectors.
- 9) Thread the strings through the small connectors at the waist measurement tape and pull through.
- 10) Attach a weight at the end of the strings respectively.
- 11) Mount a reading aide onto the front measurement tape and then pull it through a large connector.
- 12) Pull the waist measurement tape through this connector at the front measurement tape.
- 13) To establish all levels simultaneously, a further four measurement tapes with hooks can be employed for womenswear. Menswear requires only three measurement tapes as the under bust is omitted.