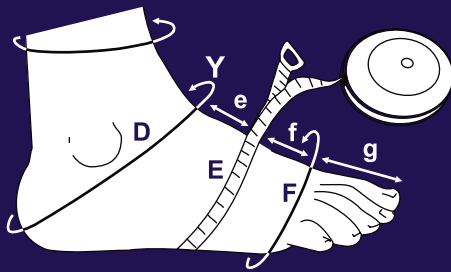


# MEASURING FOR CUSTOM-MADE PRESSURE GARMENTS

## THE LOWER EXTREMITY



Revised January 2013

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20130817\_A

## #19 Two Legs to Waist

Requested features:

1. color: C07 Royal Blue
2. posterior knee inserts
3. lateral zippers, waist down 12 inches
4. expansion panels (2 inches wide, posterior from the waist to the planter foot would be the default)
5. open pubis
6. hook & loop at the top of the garment to connect it to the torso garment.
7. Silon-TEX lining is requested and shown on an attached Sketch Pad illustration (p. 68).

The distance between the last two circumferences is not the standard 1.5 inches. The actual distance (5/8 inch in the example) is written with a carat between the last two circumferences.

The fold-floor distance of 29 1/8 inches compares well to the leg length of 26 1/8 inches. See pages 52 or 55 (depending on your choice of measuring method) for a discussion of one of the most common errors in measuring the lower extremity.

### LOWER EXTREMITY MEASUREMENT CHART

Bio-Concepts Custom Pressure Garments are available only under Physician's Order

Patient Doe, Jane  
Last Name First Name

Date 06/07/2013

Garment color C07

Insert: Posterior Knee- bilateral

Lining: Silon-TEX see sketch pad

Zipper(s):  
 Left  Lateral  Medial  Hook & loop zipper stop tab  
 Right  Lateral  Medial  Hook & loop zipper stop tab

Length (if not full) & Location: 12" L & R from waist

Expansion panel  Left  Right  
(default location is posterior leg)

Suspenders:  Attached  Removable  
 Open pubis  Waist hook & loop tabs to attach to torso (N/C)  
 Closed pubis

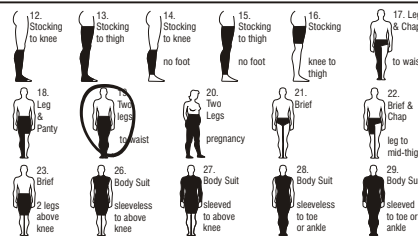
Refer to the Bio-Concepts Measuring Manual for detailed procedures, additional instructions, and example measuring charts.

Additional instructions or comments:

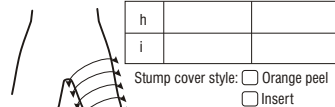
Close-knit Material



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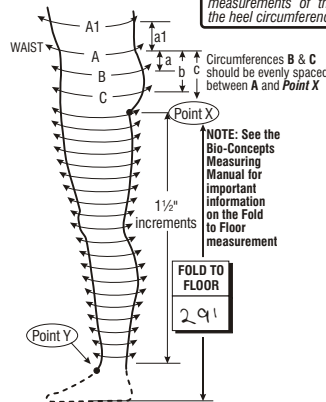


STUMP MEASUREMENT LEFT RIGHT



Stump cover style:  Orange peel  Insert

Use this form for all garments requiring measurements of the leg(s). Use the FOOT MEASUREMENT CHART for all measurements of the foot (including the heel circumference).



NOTE: See the Bio-Concepts Measuring Manual for important information on the Fold to Floor measurement

FOLD TO FLOOR  
29 1/8

TORSO	
A	30 0
B	34 6
C	38 4
a	2 5+
b	6 4
c	10 4
A <sub>1</sub>	29 5
a <sub>1</sub>	2 1

START AT X or Y	LEFT LEG	RIGHT LEG
0		
1 1/2	8 4+	8 4
3	9 0+	9 6
4 1/2	10 4	11 0
6	12 0	11 5
7 1/2	12 6	13 2+
9	14 0	15 0
10 1/2	14 6	15 0
12	14 6	14 5
13 1/2	13 7+	13 4
15	13 3	13 6+
16 1/2	14 4	15 4
18	15 2	16 5
19 1/2	16 6	17 1
21	18 0	18 7
22 1/2	18 7+	20 0
24	21 4	21 3
25 1/2	22 3	22 6
27	22 4	23 0
28 1/2		
30		
31 1/2		
33		

PLEASE DO NOT WRITE IN MARGINS

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See page 16 for an explanation of the shorthand measurement notation system.

## Lower Extremity Chart -- EXAMPLE

## MEASURING THE LOWER EXTREMITY

- Circumference measurements are designated with capital letters (**A1** through **C**). Surface distance measurements are indicated with lower case letters (**a1** through **c**).
- Measurements of the lower leg and foot may be taken with the patient sitting, but for the lower torso and upper legs the patient should be standing.
- Measurements of the lower torso should always be made from the back, not the side or front.
- **The waist is where the patient normally wears trousers, briefs, or skirts.** For some patients, particularly the obese patient, the waist may be higher in the back than in the front. See page 52. For these individuals, it would be acceptable to specify two values for **c**, one for the back and one value for the front. Write both numbers in the appropriate **Torso Measurement Chart** box.

### Measurement Techniques

There are two primary measurement techniques for the extremities: the "Mark and Measure Method" and the "Paper Tape Method." Neither method is inherently superior over the other. Both methods, when properly done, will yield correct measurements. If you or your facility have no previous experience measuring extremities for custom garments, we suggest you begin by learning the Mark and Measure Method. This is the method that all Bio-Concepts technicians are trained to use and we can, therefore, be more helpful in guiding you in the use of this method.

The Mark and Measure Method involves making a mark on the patient with a pen, every  $1\frac{1}{2}$  inches from where the stocking will begin to where the stocking will end. Very often, the last mark will not be  $1\frac{1}{2}$  inches from the second to the last mark. Measure the actual distance between the last two marks and record it on the **Lower Extremity Measurement Chart** as shown in the example on page 50. Using the retractable tape measure or the wide tape measure, measure the circumference of the leg at each mark.

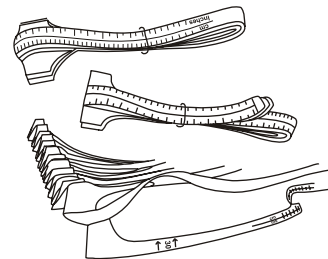
The Paper Tape Method involves the use of paper measuring tapes, Full Length Leg or Knee High, which are paper straps spaced every  $1\frac{1}{2}$  inches along a central spine. Place the spine against the leg, beginning where the stocking is to begin, wrap each strap around the leg and secure with cellophane tape. Keep wrapping around the leg until the desired end is reached and tear off any remaining portion of straps. Then tear the straps so the whole assembly can be removed from the limb. Read the measurements along the straight part of the paper tape spine.



Retractable Tape



Wide Tape



Paper Tape

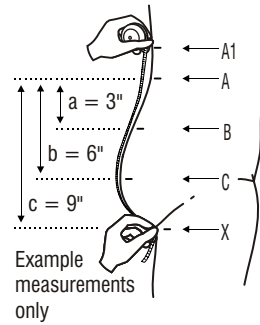
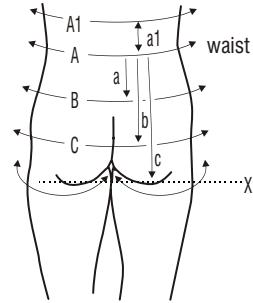
**Mark and Measure Method**

**Lower Torso Only**

We require a circumference around the waist, **A**, and two more circumferences, **B** and **C**, approximately evenly spaced between the waist and the fold of the buttocks, **Point X**, and the distances between the circumferences and **Point X**.

The circumference **A1** would be needed if the lower extremity garment will be worn with a vest and it is desired that the two garments should overlap. In this case, **A1** would be the circumference at the top of the garment and **a1** would indicate how high the top of the garment would be above the waist.

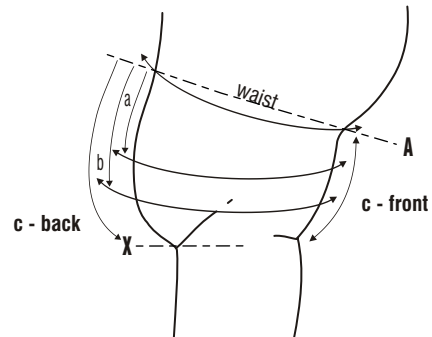
Measure **A**, the waist circumference, and make a mark on the patient just above one of the buttocks. Measure **c**, the distance between the waist and **Point X**, the fold of the buttocks. Write both measurements on the **Lower Extremity Chart**. Measure circumferences **B** & **C** approximately one-third of **c** apart from each other between **A** and **X** and make a mark on the patient to locate these measurements. For example, if **c** is 9 inches, then measure **B** 3 inches below **A** and measure **C** 6 inches below **A**.



**The Obese Patient and Small Children**

The obese patient and very young children from infancy to approximately three years of age may present with a large belly. Unless some compensation is made for this feature in the measurements, the lower torso portion of the garment may be too low in the back and too high in the front.

As shown below, simply take two **c** measurements, one in the front and one in the back and write both measurements on the **Lower Extremity Measurement Chart** in the box provided for **c**. It is not necessary to label or explain the two measurements, the difference between the two lengths will be used to make the vest longer in the front than in the back.



Example measurements for a lower torso garment showing the procedure for recording a longer back than front.

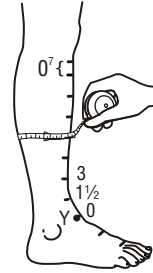
a	7 <sup>2</sup>
b	10 <sup>6</sup>
c	14 <sup>1</sup> / 11 <sup>0</sup>
A <sub>1</sub>	

### Legs and Feet

Detailed measurement procedures for the foot are covered in the next chapter (page 58).

#### Begin at Point Y

Measure the circumference of the heel and make a mark on the patient at the anterior of the ankle at **Point Y**. This is circumference **D** and is entered into the appropriate blank on the **Foot Measurement Chart**. With the 0 inch mark of the measuring tape at **Point Y**, make a mark on the front of the leg every  $1\frac{1}{2}$  inches up to as far as you want the garment to extend. Record these leg circumferences on the **Lower Extremity Chart** as shown in the example. The top two circumferences may not be  $1\frac{1}{2}$  inches apart. If so, measure the actual distance between the two and record this on the chart as shown in the example.



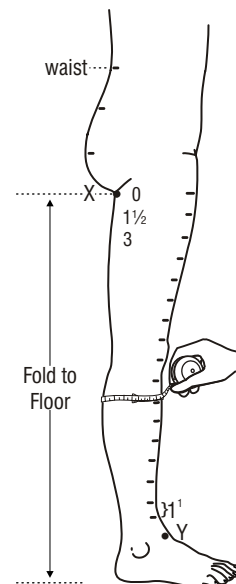
### Measuring for the Lower Torso, Legs, and Feet

Detailed measurement procedures for the foot will be covered in the next section.

Measure the lower torso as described at the beginning of this section (page 52).

#### Begin at Point X

With the 0 mark of the measuring tape at **Point X**, make a mark on the front of the leg every  $1\frac{1}{2}$  inches down to as far as you want the garment to extend. The bottom two measurements may not be  $1\frac{1}{2}$  inches apart. If so, measure the actual distance between the two. Measure the circumferences and record them on the **Lower Extremity Measurement Chart**. With the patient standing erect, use the measuring tape to measure the distance from the fold of the buttocks to the floor. Be sure to hold the measuring tape as vertical as possible, and always take this measurement from the back of the patient. Record this measurement in the special box on the **Lower Extremity Measurement Chart**.



### Note

**A common error is to take too many leg circumferences, resulting in little or no difference between the recorded height of the leg above Point Y and the fold-floor distance.**

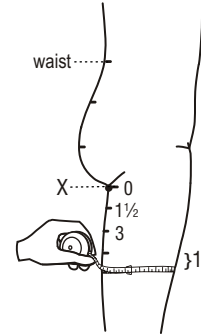
When measuring for a garment which includes the lower torso, legs, and feet, always check the difference between the leg length and the fold-floor distance. This measurement is a way to check the accuracy of the leg measurements. In the example measurement chart on page 50, the left leg circumferences end at  $26\frac{3}{8}$  in. above **Point Y**. Subtracting this from the fold-floor measurement of  $29\frac{3}{8}$  in. leaves 3 in. for the height of the foot. Approximately correct for an adult female.

### Lower Torso and Legs

If the garment includes the lower torso and the legs above the feet, take the lower torso measurements as described above, then take leg circumferences beginning at **Point X** as described below.

#### *Begin at Point X*

With the 0 mark of the measuring tape at **Point X**, make a mark on the back of the leg every  $1\frac{1}{2}$  inches down to as far as you want the garment to extend. The bottom two measurements may not be  $1\frac{1}{2}$  inches apart. If so, measure the actual distance between the two. Measure the circumferences and record them on the **Lower Extremity Measurement Chart**.

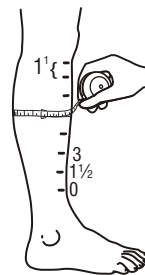


### Legs Only

These lower extremity garments include the **#14 Stocking to Knee, no foot**, **#15 Stocking to Thigh, no foot**, and **#16 Stocking Knee to Thigh**. Garments which do not include the lower torso or the foot can be measured from the back or front of the leg. Start your measurements at the top or bottom of the the desired top or bottom of the garment, although you may find that it is most convenient to measure from the back if the garment is above the knee, and from the front if the garment is below the knee.

#### *Begin at Top or Bottom of Garment*

Make a mark on the leg where you want to begin. Hold the measuring tape vertical against the leg and make additional marks every  $1\frac{1}{2}$  inches to the desired end of the garment. Measure the circumference at each mark and record the measurements on the **Lower Extremity Measurement Chart**.



**Paper Tape Method for the Legs**

**Lower Torso, Legs, and Feet**

If the garment is to include the lower torso and the feet, measure the lower torso according to the instructions given previously.

Begin by securing the strap marked "HEEL" around the ankle to the back of the heel as shown. This is circumference **D** and is entered into the appropriate blank on the **Foot Measurement Chart**. Align the spine of the tape, that is, the straight edge of the colored portion, with the front of the foot and leg.

Secure the foot tapes around the foot; there could be from two to five foot tapes depending on the length of the foot. Secure additional straps around the thigh up the leg to **Point X**. The top two circumferences may not be  $1\frac{1}{2}$  inches apart. If so, measure the actual distance between the two and record this on the chart as shown in the example.

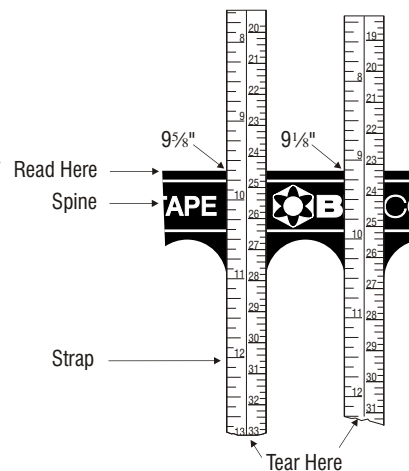
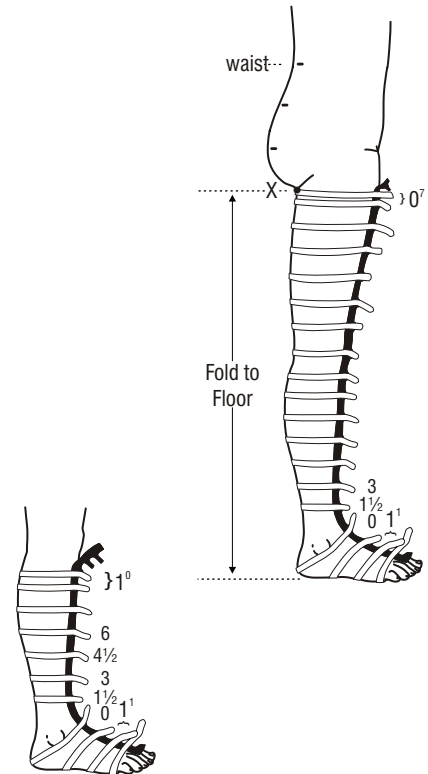
**Note**

*A common error is to take too many leg circumferences, resulting in little or no difference between the recorded height of the leg above Point Y and the fold-floor distance.*

When measuring for a garment which includes the lower torso, legs, and feet, always check the difference between the leg length and the fold-floor distance. This measurement is a way to check the accuracy of the leg measurements. In the example measurement chart on page 50, the left leg circumferences end at  $26\frac{1}{8}$  in. above **Point Y**. Subtracting this from the fold-floor measurement of  $29\frac{1}{8}$  in. leaves 3 in. for the height of the foot. Approximately correct for an adult female.

**Legs and Feet**

If the garment is to include the feet and legs, but not the lower torso, begin by wrapping and securing the strap marked "HEEL" around the ankle to the back of the heel as shown. This is circumference **D** and is entered into the appropriate blank on the **Foot Measurement Chart**. Align the spine of the tape, that is, the straight edge of the colored portion, with the front of the foot and leg.

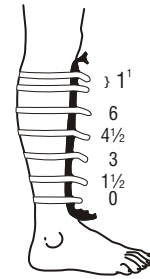


Secure the foot tapes around the foot; there could be from two to five foot tapes depending on the length of the foot. Continue wrapping and securing the tapes around the leg to as high as you want the garment to extend. The circumference at the very top of the garment should be slightly smaller than the circumference immediately below. Otherwise the garment is likely to slide down. Please speak with one of our designers if the nature of the patient and the patient's diagnosis is such that the top circumference cannot be smaller. There are ways to design garments that will stay up on most patients.

The top two circumferences may not be  $1\frac{1}{2}$  inches apart. If so, measure the actual distance between the two and record this on the **Lower Extremity Chart** as shown in the example.

**Legs Only**

The procedure for using the paper tapes for measuring legs without including either the lower torso or the foot is similar. Wrap the first strap around the leg wherever you want the garment to begin. Continue wrapping straps around the leg as high as you want the garment to extend. Pleat the spine of the tape if the last circumference is less than  $1\frac{1}{2}$  inches from the previous circumference.

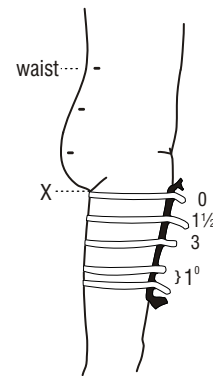


**Lower Torso and Legs**

If the garment is to include the lower torso and legs, measure the lower torso according to the instructions given previously.

Begin by securing the first strap around the top of the leg. Align the spine of the tape, that is, the straight edge of the colored portion, with the front of the leg.

Secure additional straps around the thigh down the leg to as far as you want the garment to extend. The bottom two circumferences may not be  $1\frac{1}{2}$  inches apart. If so, measure the actual distance between the two and record this on the chart as shown in the example.





## **Common Options for Lower Extremity Garments**

### **Inserts**

Posterior knee inserts are frequently requested for lower extremity garments incorporating the knee. The insert is a piece of soft stretchy **Insert Material** positioned over the popliteal crease. This helps prevent bunching of the regular garment fabric. Abdominal Inserts may be requested for patients with distended or tender abdomen.

### **Linings**

Any part of the garment may be lined with Lining Material (page 10). Linings work especially well to prevent soreness resulting from rubbing, such as the knee or the anterior thigh.

### **Expansion Panels**

Expansion panels, made of soft stretchy Insert Material (page 10), are normally installed posterior in a lower extremity garment. A posterior expansion panel in a stocking includes the back of the leg, the heel, and the plantar foot surface. Expansion panels may add to the life of a garment for a growing pediatric patient or for an adult with changing measurements.

### **Zippers**

For some patients a zipper may be needed in a lower extremity garment so the patient can get it over the foot. Zippers may be lateral or medial, and normally end at **Point Y**. Anterior or posterior zippers are technically feasible, but should only be requested in extreme cases where the lateral and medial surfaces are too painful or otherwise involved.

### **Pubis Construction**

The default pubis for a male lower torso/extremity garment is closed with a horizontal fly, while the default pubis for a female is closed with a soft crotch gusset. Specify "open pubis" and we make the garment with a large pubic opening.