



CAROLON
graduated compression

Summary of Test Results
VS
Siegel Profile

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ALL CAROLON AES GARMENTS CONFORM TO SIEGEL PROFILE AT +/-20% VARIANCE. CAROLON THIGH LENGTH AES HAVE A SEWN-IN GUSSET SO THAT PRESSURE IS FULLY GRADUATED THROUGHOUT, INCLUDING AT THE THIGH BAND ITSELF.

Last updated: September 2009

Testing Review

NICE, 19 April 2007

- On admission to hospital, offer all surgical inpatients thigh-length graduated compression/ anti-embolism stockings, unless contraindicated (for example, in patients with established peripheral arterial disease or diabetic neuropathy). If thigh-length stockings are not appropriate (for reasons of fit or compliance) knee-length stockings may be used instead.
- The stocking compression profile should be equivalent to the Sigel profile, and approximately:
 - 18 mmHg at the ankle
 - 14 mmHg at the mid-calf
 - 8 mmHg at the upper thigh.

British Standard for Stiffness specifies that the compression at any point should not vary more than 20 % using one size larger and one size smaller formers.

Based on the 20 % variance, the acceptable range for compression to meet the Siegel profile would be:

- 14.4 – 21.6 mmHg Ankle,
- 11.2 – 16.8 mmHg Mid Calf
- 6.4 – 9.6 mmHg Upper Thigh

Test Methods

SMTL

BS 7672 Anti-Embolism Stocking
Stockings are tested after 1 and 30 washings
Stiffness test is performed

HTC

BS 6612 Graduated Compression Hosiery
Stockings are conditioned (left in the lab for 24 hours) and tested out of the bag

The same testing device (Hatra) and formers are used for both tests.

The summery covers stockings tested out of the bag, after 1 washing and after 30 washings.

Testing

- Testing under the BS Standards test a particular size and do not cover the range as specified by a manufacturer.
- Neither test specifies testing the largest calf circumference; specifications specify a height from the bottom of the heel area to a testing point. This can be above the largest calf circumference and reflects lower compressions than the largest calf pressures.
- Neither test specifies a thigh band pressure.

Test Results

- Carolon variance from Siegel
Ankle .4 mmHg, Calf 2.2 mmHg, Thigh .6 mmHg

Thigh Band Compression

The NICE Guidelines specify that patients should receive Thigh length Stockings if possible.

Excessive compression under the band of a thigh length stocking can reduce the flow in the leg as the band can act as a tourniquet. The compression under the gusset should be less than the mid thigh to maintain graduated compression.

The HTC test has included in addition to the specified testing locations the thigh band compression. This is the first test conducted for this area of the anti-embolism stocking.

Band-Gusset, Band Compression TS39984

This test covered the testing of two types of bands not sewn onto a stocking

Elastic Fabric

This is a thigh band using the elastic band material with the Polyisoprene non slit interior with a fabric gusset sewn in. tests were conducted by testing the elastic band (Elastic) and the gusset (fabric).

Elastic Only

This was a band without a gusset that consisted of the elastic material only

Results

Because of the different stretch characteristics of the materials the gusset produces lower compression than the elastic material in the elastic/fabric test. The elastic/fabric band also had a lower compression value than the elastic only due to the ability of the fabric to stretch more than the elastic material.

HTC Stocking Band Test

The stocking bands were tested with the band sewn on to the stocking. Tests were performed on both the elastic band material and the gusset. As the test on the two types of bands showed, the compression reduced under the gusset and the overall pressure was less with a elastic/fabric band than a solid band.

The band compression should be less than the upper thigh maintaining graduated compression.



Compression Profiles-Test Summary
May 2009

CAP Anti-Embolism Stocking, Thigh Length
Siegel Profile
NICE, 19 April 2007

SMTL*

Ankle	Calf	Mid Thigh	Band Elastic	Band Gusset
16.25	12.16	6.33	N/A	N/A

Stiffness All sizes comply

HTC**

Ankle	Calf	Mid Thigh	Band Elastic	Band Gusset
19.6	11.4	8.0	5.5	3.5

Average Compression

Ankle	Calf	Mid Thigh	Band Elastic	Band Gusset
17.9	11.8	7.2	5.5	3.5

*SMTL 06/2147/1 **HTC TS 39986-TS39989



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Attn: Larry Oates
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Rural Hall, NC

SUBMITTED DATE: July 16, 2009
COMPLETION DATE: July 21, 2009

REFERENCE:

TS42769
Style: 521
Size: Medium
Color: White
Description: Knee High Compression
Sample Type: Knitted Fabric
Sample Form: Hosiery

TEST METHOD:

- Compression Properties - BS 6612, British Standards Institution
- Compression Settings: Calf Plate at position 2, Short Suspender Bar at position 3
- ASTM D 1776, "Standard Practice for Conditioning and Testing Textiles," ASTM International

TEST RESULTS:

Gament Position	<u>Ankle</u>	<u>Calf</u>
Tested Circumference on CMD (cm)	21.8	33.0
Sample 1 (mmHg)	13.9	12.5
Sample 2 (mmHg)	15.4	12.2
Sample 3 (mmHg)	15.5	12.4
Sample 4 (mmHg)	15.6	11.9
<i>avg (mmHg)</i>	<i>15.1</i>	<i>12.3</i>
Target NICE Guidelines [April 2007] (mmHg)	18.0	14.0
20% Sigel Profile Tolerance (mmHg)	(14.4 - 21.6)	(11.2 - 16.8)
Garment Within ± 20% of Sigel Profile	Yes	

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The test results are based on the submitted sample(s) only. MSC/HTC's liability shall not exceed the fees paid for the testing reflected on this report. It is the customer's responsibility to ensure that they comply with all U.S. federal, state/local laws & regulations. These results may be used for marketing purposes but not as an endorsement. The test report shall not be reproduced except in full, without written approval from MSC/HTC. All results will be kept confidential.



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Attn: Larry Oates
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SUBMITTED DATE: July 16, 2009
COMPLETION DATE: July 21, 2009

REFERENCE:

TS42770

Style: 531

Sample Type: Knitted Fabric

Size: Large

Sample Form: Hosiery

Color: White

Description: Knee High Compression

TEST METHOD:

- Compression Properties - BS 6612, British Standards Institution
- Compression Settings: Calf Plate at position 2, Short Suspender Bar at position 4
- ASTM D 1776, "Standard Practice for Conditioning and Testing Textiles," ASTM International

TEST RESULTS:

Gament Position	<u>Ankle</u>	<u>Calf</u>
Tested Circumference on CMD (cm)	25.7	37.9
Sample 1 (mmHg)	19.1	12.7
Sample 2 (mmHg)	16.8	12.0
Sample 3 (mmHg)	17.9	11.4
Sample 4 (mmHg)	15.7	12.0
<i>avg (mmHg)</i>	<i>17.4</i>	<i>12.0</i>

<i>Target NICE Guidelines [April 2007] (mmHg)</i>	18.0	14.0
<i>20% Sigel Profile Tolerance (mmHg)</i>	(14.4 - 21.6)	(11.2 - 16.8)
<i>Garment Within ± 20% of Sigel Profile</i>	Yes	

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Attn: Larry Oates
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SUBMITTED DATE: July 16, 2009
COMPLETION DATE: July 21, 2009

REFERENCE:

TS42771

Style: 541

Sample Type: Knitted Fabric

Size: X-Large

Sample Form: Hosiery

Color: White

Description: Knee High Compression

TEST METHOD:

- Compression Properties - BS 6612, British Standards Institution
- Compression Settings: Calf Plate at position 2, Short Suspender Bar at position 5
- ASTM D 1776, "Standard Practice for Conditioning and Testing Textiles," ASTM International

TEST RESULTS:

Gament Position	<u>Ankle</u>	<u>Calf</u>
Tested Circumference on CMD (cm)	27.5	40.6
Sample 1 (mmHg)	16.0	11.7
Sample 2 (mmHg)	15.1	11.5
Sample 3 (mmHg)	13.2	11.0
Sample 4 (mmHg)	15.3	11.3
<i>avg (mmHg)</i>	<i>14.9</i>	<i>11.4</i>
<i>Target NICE Guidelines [April 2007] (mmHg)</i>	18.0	14.0
<i>20% Sigel Profile Tolerance (mmHg)</i>	(14.4 - 21.6)	(11.2 - 16.8)
<i>Garment Within ± 20% of Sigel Profile</i>	Yes	

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Attn: Larry Oates
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SUBMITTED DATE: April 29, 2009
COMPLETION DATE: May 11, 2009

REFERENCE: TS39984
Style: Thigh Band
Size: Med
Color: White

TEST METHOD:

- Compression Properties - BS 6612, British Standards Institution
- Compression Settings: Calf Plate at position 2, Thigh Plate at position 3
- ASTM D 1776, "Standard Practice for Conditioning and Testing Textiles," ASTM International

TEST RESULTS:

Gament Position	<u>Elastic</u>	<u>Gusset</u>	<u>Elastic Only</u>
Tested Circumference on CMD (cm)	53.0	53.0	53.0
Sample 1 (mmHg)	3.2	3.7	7.5
Sample 2 (mmHg)	4.3	3.1	6.3
Sample 3 (mmHg)	3.5	2.3	8.8
Sample 4 (mmHg)	3.2	3.2	9.6
<i>avg (mmHg)</i>	<i>3.6</i>	<i>3.1</i>	<i>8.1</i>

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