

シリコーン製

# アルファ スマートテンプライナー

完成用部品認可済 <ライナー Aピンアタッチメントなし / ウィローウッド T350-SIZE>  
<ライナー Bピンアタッチメントあり / ウィローウッド T352-SIZE>

WillowWood  
ALPHA SmartTemp  
Featuring 



## ライナー装着時の汗でお悩みの方へ！



## 断端の熱を吸収し、肌の温度を快適に保ちます。

### ■発汗のタイミングを遅らせます。

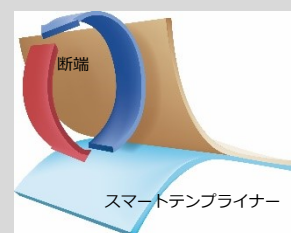
スマートテンプライナーは断端の余分な熱を吸収し、発汗を遅らせます。

### ■断端を快適に保ちます。

肌の温度が下がればライナーに吸収されていた熱を放出し、断端表面の温度を終日一定に保ちます。

### ■クッション性があります。

断端の熱を吸収すると柔らかさが増します。



株式会社 田沢製作所 マーケティング部直通ダイヤル

〒113-0033 東京都文京区本郷1-35-28 メゾンドール本郷2F TEL.03-3812-6481 FAX.03-5804-8595

# 大腿用スマートテンプレライナー 品番とサイズチャート

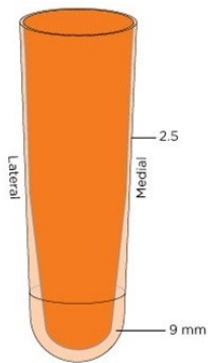


## ●スマートテンプレAK用 ロッキングライナー

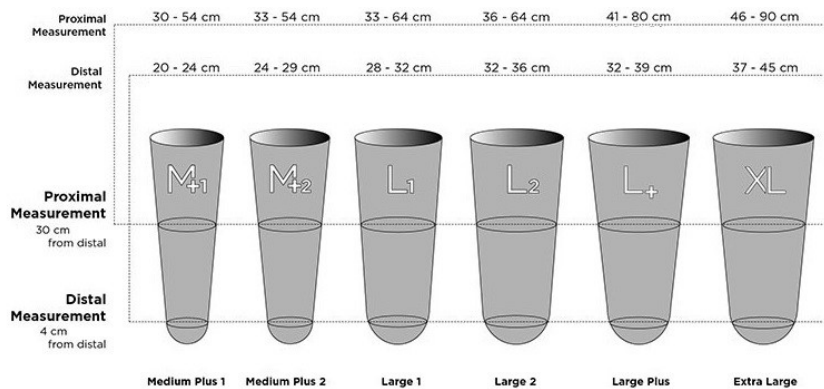
品番	サイズ	スタイル (形状)	国内在庫の有無
T442-1694-1	Mプラス1	シンメトリカル	有
T442-1694-2	Mプラス2	シンメトリカル	有
T442-1696-1	L1	シンメトリカル	有
T442-1696-2	L2	シンメトリカル	有
T442-1698-1	Lプラス	シンメトリカル	有
T442-1697-1	XL	シンメトリカル	有

## ●スマートテンプレAK用 クッションライナー

品番	サイズ	スタイル (形状)	国内在庫の有無
T440-1690-1	Mプラス1	シンメトリカル	有
T440-1694-2	Mプラス2	シンメトリカル	有
T440-1696-1	L1	シンメトリカル	有
T440-1696-2	L2	シンメトリカル	有
T440-1698-1	Lプラス	シンメトリカル	有
T440-1697-1	XL	シンメトリカル	有



【シンメトリカルスタイル】



# 下腿用スマートテンプライナー 品番とサイズチャート

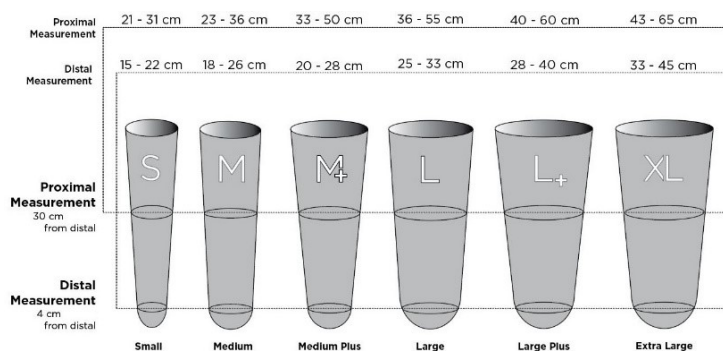
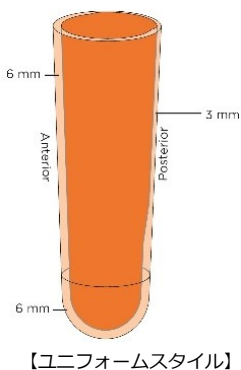
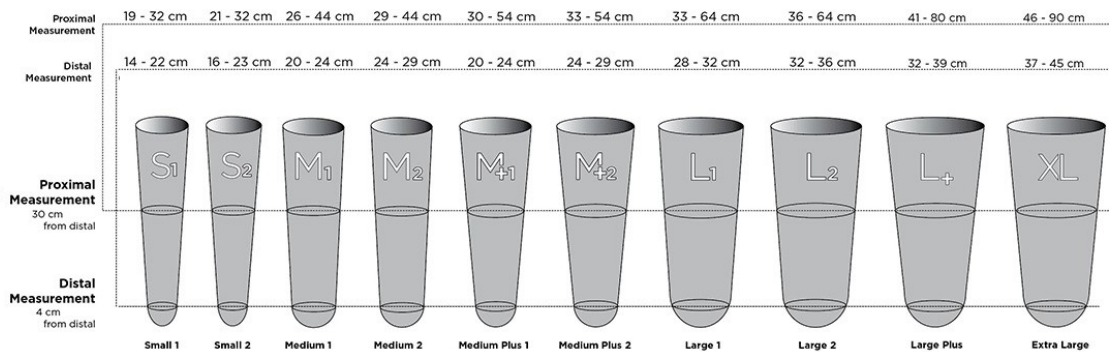
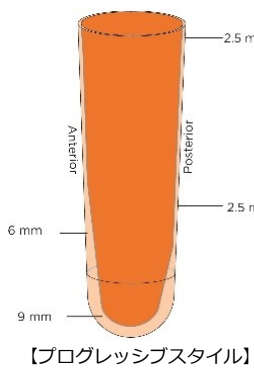


## ●スマートテンブ ロッキングライナー

品番	サイズ	スタイル (形状)	国内在庫の有無
T352-6593-1	S1	プログレッシブ	有
T352-6593-2	S2	プログレッシブ	有
T352-6590-1	M1	プログレッシブ	有
T352-6590-2	M2	プログレッシブ	有
T352-6594-1	Mプラス1	プログレッシブ	有
T352-6594-2	Mプラス2	プログレッシブ	有
T352-6596-1	L1	プログレッシブ	有
T352-6596-2	L2	プログレッシブ	有
T352-6598-1	Lプラス	プログレッシブ	有
T352-6597-1	XL	プログレッシブ	有
T351-5363	S	ユニフォーム	無 (取寄せ)
T351-5360	M	ユニフォーム	無 (取寄せ)
T351-5364	Mプラス	ユニフォーム	無 (取寄せ)
T351-5366	L	ユニフォーム	無 (取寄せ)
T351-5368	Lプラス	ユニフォーム	無 (取寄せ)
T351-5367	XL	ユニフォーム	無 (取寄せ)

## ●スマートテンブ クッションライナー

品番	サイズ	スタイル (形状)	国内在庫の有無
T350-6593-1	S1	プログレッシブ	無 (取寄せ)
T350-6593-2	S2	プログレッシブ	無 (取寄せ)
T350-6590-1	M1	プログレッシブ	無 (取寄せ)
T350-6590-2	M2	プログレッシブ	無 (取寄せ)
T350-6594-1	Mプラス1	プログレッシブ	無 (取寄せ)
T350-6594-2	Mプラス2	プログレッシブ	無 (取寄せ)
T350-6596-1	L1	プログレッシブ	無 (取寄せ)
T350-6596-2	L2	プログレッシブ	無 (取寄せ)
T350-6598-1	Lプラス	プログレッシブ	無 (取寄せ)
T350-6597-1	XL	プログレッシブ	無 (取寄せ)
T350-5363	S	ユニフォーム	有
T350-5360	M	ユニフォーム	有
T350-5364	Mプラス	ユニフォーム	有
T350-5366	L	ユニフォーム	有
T350-5368	Lプラス	ユニフォーム	有
T350-5367	XL	ユニフォーム	有





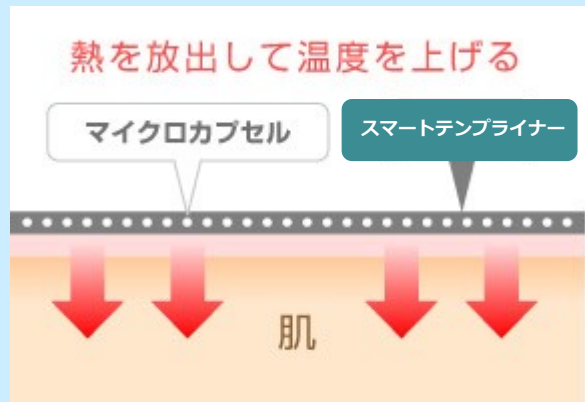
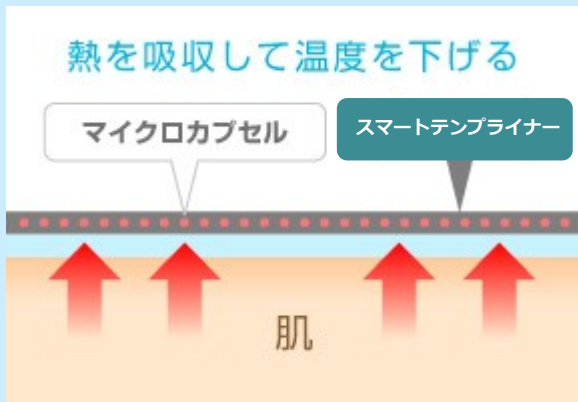
アウトラスト®はNASAのために開発された優れた温度調整素材です。

過酷な宇宙空間で船外活動を行う宇宙飛行士のグローブに使用するために開発された素材です。宇宙空間の激しい温度変化にも対応し、暑いときは熱を吸収し、寒いときは熱を放出し、温度を一定に保つように働きかけます。

# アウトラスト®技術が断端を快適に保ちます。

暑いときは、肌を冷やします。

寒いときは、肌を暖めます。



人間が一番快適だと感じる肌の表面温度は31℃～33℃に保たれている時と言われています。スマートテンプライナー内部に含まれる2～30ミクロンという小さなマイクロカプセルの中に入ったパラフィンワックスが、体からの余分な熱を吸収し、寒くなると蓄えていた熱を放出するという働きで、肌の表面温度を31℃～33℃にキープしようとして働きかけます。

## スマートテンプライナーに関する文献紹介

### SmartTemp Prosthetic Liner Significantly Reduces Residual Limb Temperature and Perspiration

Matthew M. Wernke, PhD, Ryan M. Schroeder, BS, Christopher T. Kelley, MS, Jeffrey A. Denune, CP, James M. Colvin, MS

**SmartTemp Prosthetic Liner Significantly Reduces Residual Limb Temperature and Perspiration**

Matthew M. Wernke, PhD, Ryan M. Schroeder, BS, Christopher T. Kelley, MS, Jeffrey A. Denune, CP, James M. Colvin, MS

**ABSTRACT**

**Background:** Common materials used for prosthetic liners do not have proven thermal properties. This includes the well-known lining in the form of elastomer and increased perspiration. The purpose of this work was to compare the temperature increase and amount of perspiration between a silicone liner and the SmartTemp liner, which incorporates phase change material to improve the thermal properties and reduce perspiration.

**Methods and Results:** Silicone and SmartTemp liners were tested on 10 individuals with lower limb prostheses. Participants were asked to rest in a laboratory for 25 minutes followed by a 15-minute workload. The activity was controlled to match individual limb length. A flow meter was used to measure perspiration. Temperature and perspiration data were collected at 15-minute intervals. A paired t-test was used to compare the data.

**Results:** The SmartTemp liner resulted in significantly reduced mean skin temperature and perspiration during the activity and rest periods when compared with the silicone liner.

**Conclusions:** The SmartTemp liner can significantly reduce the thermal environment. Reducing temperature and reducing the amount of perspiration can improve comfort and reduce the risk of skin injury to persons with amputation who use a prosthesis. (Prosthet Orthot 2015;29:124-131)

**KEYWORDS:** prosthetic liner, prostheses, socks, interface, heat, amputation, lower limb

Excessive perspiration and temperature are commonly associated with wearing and using prosthetic limbs. The prosthetic socket and interface materials can improve the comfort and quality of life and provide a higher level of retention for individuals with amputation. To improve the thermal properties of the prosthetic liner, the SmartTemp liner (The Ohio Willow Wood Company, Mount

STERLING, OH, USA) incorporates phase change material (PCM) into a flexible silicone liner. Phase change materials have the ability to store and release thermal energy as it changes physical state from solid to a liquid (heat of fusion) and back to a solid, maintaining the conditions of the surrounding environment for longer periods. The purpose of this work was to compare the residual limb skin temperature and the amount of perspiration produced by individuals with amputation wearing the SmartTemp liner and a silicone liner. The hypothesis was that the SmartTemp liner will reduce the internal limb temperature as well as the amount of perspiration during activity and during postactivity rest periods.

**METHODS**

**DESIGN**

A double-blind, randomized, crossover design was used to compare outcomes between the SmartTemp liner and silicone SmartTemp liner (Figure 1). Sixteen individuals with terminal amputations (Table 1), all with above-knee amputations, were recruited to participate in the study protocol. Eligibility criteria stated that subjects had to be 18 years old, amputated or other reasons, must be able to ride a stationary bike continuously for 15 minutes, must be older than 18 years, and able to consent without assistance. Upon agreeing to participate, subjects were randomly placed in either the SmartTemp or silicone, such that they did not know which liner they were wearing over to the other treatment (Table 1). The allocation sequence was managed by the individual independent researcher using a random number generator. The subjects were instructed to rest for 25 minutes, data collection, and data analysis. During the testing, each individual received two trials of the SmartTemp liner in a randomly assigned order. The subjects and the other "blinded" treatment ("B" on the SmartTemp liner and "S" on the silicone liner) were not aware of the treatment.

**RESULTS**

Mean skin temperature was recorded by a T-type thermocouple (E-C Sensing, Billerica, MA, USA) and the space heater was used to maintain a constant temperature. Four additional thermocouples were placed at the following locations: distal end of the residual limb, medial malleolus, lateral malleolus, lateral ankle, and lateral ankle. The mean skin temperature was measured at 15-minute intervals at the distal end of the residual limb at each location. Once the thermocouples were placed, there was a 15-minute rest period to allow the residual limb to equilibrate with the environment. The equilibrium temperature was recorded ("end of equilibrium" temperature).

After 15 minutes, the subject donned the treatment B liner and the prostheses. Once the subject was on the stationary bike and stable, the subject was instructed to begin pedaling at a self-selected pace, and the temperature recording (thermocouple, 0.5 Hz signal). The researcher monitored a continuous feed to the pedaling cadence of the subject. The maximum heat was recorded and used to maintain consistent pedaling effort during the remainder of the first treatment and the second treatment.

After 25 minutes, the subject transferred to a chair and donned the prostheses and liner. The amount of perspiration was measured and recorded by wiping the residual limb and distal limb with a sterile plastic bag and weighing on a digital scale. The weight was compared with the weight of the laboratory towel and sealed plastic bag before wiping the limb and the difference in weight was recorded as the amount of perspiration.

Immediately after the residual limb and liner were wiped, the subject returned the liner and was instructed to rest in a chair. Temperature data were collected for 10 minutes while the subject rested. After the 10-minute rest period, the subject donned the liner and the amount of perspiration was collected and recorded.

**PROCEDURES**

Data were collected during one testing day for each subject. The data collection room was maintained at 26.7°C using a

Table 1. Subject demographics

ID	Group	Age	Sex	Amputated Limb	Occupation	Ethnicity	Years with Amputation
1	A	40	Male	Right	Preaching	Caucasian	11
2	A	47	Male	Right	Business	Caucasian	10
3	B	40	Male	Right	Nurse	Latino	10
4	B	40	Male	Right	Nurse	Caucasian	10
5	A	47	Male	Left	Nurse	Caucasian	10
6	B	40	Male	Left	Nurse	Caucasian	10
7	B	40	Male	Right	Nurse	Caucasian	10
8	B	40	Male	Right	Preaching	Caucasian	10
9	A	38	Male	Right	Preaching	Caucasian	17
10	A	40	Male	Right	Preaching	Caucasian	10
11	B	40	Female	Right	Nurse	Caucasian	2
12	B	40	Female	Right	Nurse	Caucasian	10
13	B	40	Female	Right	Nurse	Caucasian	10
14	A	40	Female	Right	Nurse	Caucasian	2
15	B	40	Female	Right	Nurse	Caucasian	10
16	A	40	Female	Right	Nurse	Caucasian	2
17	A	40	Female	Right	Nurse	Caucasian	10
18	A	40	Female	Right	Nurse	Caucasian	10
19	A	40	Female	Right	Nurse	Caucasian	10
20	A	40	Female	Right	Nurse	Caucasian	10
n		40.2					10.2

Wernke M, et al. 2015

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**SmartTemp Liner Reduces Residual Limb Perspiration**

Journal of Prosthetics and Orthotics

**ABSTRACT**

The research team remained blind to the treatments until the data were presented. One of the subjects was an individual with a bilateral terminal amputation and they participated as two subjects, where the placebo and real SmartTemp liner were tested at the same time. The liner was worn on the opposite limb for the second data collection period.

**PROCEDURES**

Data were collected during one testing day for each subject. The data collection room was maintained at 26.7°C using a

Table 1. Subject demographics

ID	Group	Age	Sex	Amputated Limb	Occupation	Ethnicity	Years with Amputation
1	A	40	Male	Right	Preaching	Caucasian	11
2	A	47	Male	Right	Business	Caucasian	10
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5	A	47	Male	Left	Nurse	Caucasian	10
6	B	40	Male	Left	Nurse	Caucasian	10
7	B	40	Male	Right	Nurse	Caucasian	10
8	B	40	Male	Right	Preaching	Caucasian	10
9	A	38	Male	Right	Preaching	Caucasian	17
10	A	40	Male	Right	Preaching	Caucasian	10
11	B	40	Female	Right	Nurse	Caucasian	2
12	B	40	Female	Right	Nurse	Caucasian	10
13	B	40	Female	Right	Nurse	Caucasian	10
14	A	40	Female	Right	Nurse	Caucasian	2
15	B	40	Female	Right	Nurse	Caucasian	10
16	A	40	Female	Right	Nurse	Caucasian	2
17	A	40	Female	Right	Nurse	Caucasian	10
18	A	40	Female	Right	Nurse	Caucasian	10
19	A	40	Female	Right	Nurse	Caucasian	10
20	A	40	Female	Right	Nurse	Caucasian	10
n		40.2					10.2

Wernke M, et al. 2015

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スマートテンプライナーとプラセボを使用した比較実験の結果、スマートテンプライナー装着時の方が断端表面温度の上昇と発汗量が抑えられたという結果となった。