



Armstrong
Medical

**Warm to
the Simplicity of**

Thermawrap...



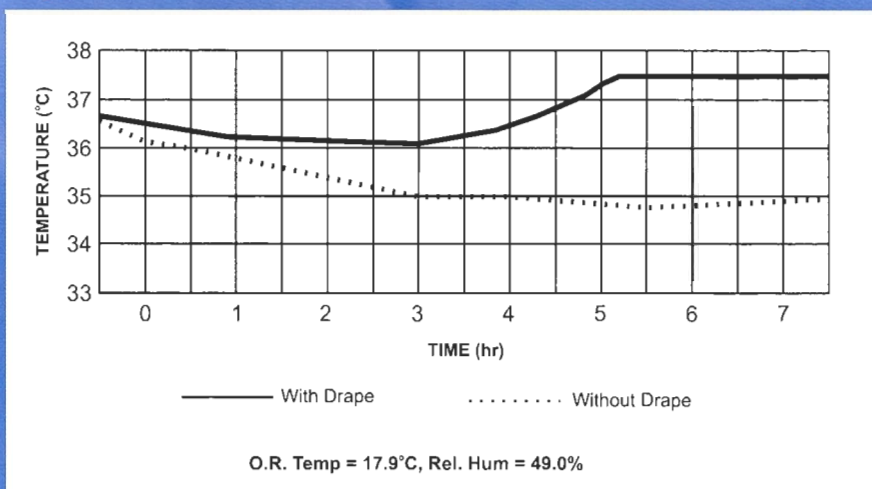
...Thermal Insulation for Surgical Patients

Core body temperature varies as much as 6°C during anaesthesia¹

Why prolong post-operative recovery as a result of hypothermia?

Use Thermawrap[®] for all anaesthetic procedures to prevent hypothermia

Figure 1: Reduction of Heat Loss Using Thermawrap[®]



Hypothermia...

Thermawrap[®] has it covered

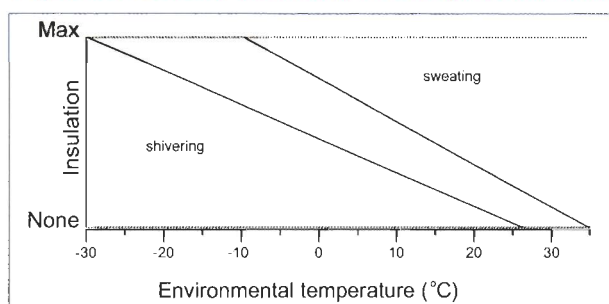
LET THE PERFORMANCE AND CONVENIENCE OF

THERMAWRAP®

ENHANCE THE QUALITY OF YOUR CARE

Thermawrap® is a simple but effective draping system to prevent patient heat loss and associated hypothermia

Figure 2: Effects of Insulating the Body with Thermawrap®



Research² shows that ambient conditions less than 27°C can trigger shivering in the absence of body insulation

The combination of low ambient temperature with the cooling effects of zero body movement and administration of cool fluids promotes hypermetabolic activity and associated shivering

What causes mild hypothermia?

- Low ambient temperature
- Operating room laminar air flow
- Zero body movement
- Administration of cool fluids and drugs
- Exposure of surgical site to ambient conditions

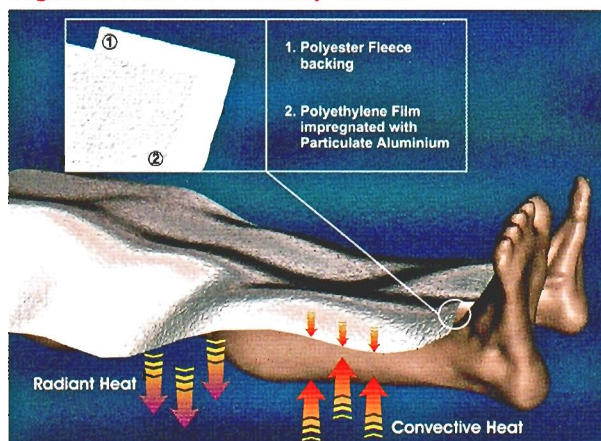
Why Thermawrap®?

Thermawrap® prevents heat loss if applied in the pre-anaesthesia phase and used until core body temperature is stable normothermic in the post-operative phase.

Unlike active warming techniques, such as warmed air, warmed water circulation and electrical heating blankets, Thermawrap® uses a simple insulation principle, thus avoiding the expense and inconvenience of using powered equipment.

Mild hypothermia is recognised as a contributory factor in prolonging post-operative recovery by 20% and has been shown to triple the incidence of surgical wound infection¹

Figure 3: How Thermawrap® Works



What is Thermawrap® made from?

Thermawrap® is manufactured from polyethylene film and particulate aluminium on a polyester fleece backing.

Is Thermawrap® safe in the operating room?

Yes. Thermawrap® is non-conductive and radiolucent making it safe for all electro-surgical and radiographic techniques.

How does Thermawrap® work?

The polyethylene film minimises convective heat loss from all body areas covered. The aluminium controls radiant heat loss from all areas covered (see Figure 3.)

Convective heat loss can account for up to 33% of patient heat loss during surgery. Radiant heat loss can account for 50% of patient heat loss during surgery. The polyester fleece backing provides a comfortable non-slip surface to allow draping.

¹Kurz A *et al.* Perioperative Normothermia to Reduce the Incidence of Surgical Wound Infection and Shorten Hospitalization. Study of Wound Infection and Temperature Group. New England Journal of Medicine 1996. May 9; 334(19): pp. 1209-1215

²Grahn D. Homeostase Thermique Chez Les Mammiferes. Urgence Pratique. vol. 44. 2001

Clinical Benefits of *Thermawrap*[®]

- | | | |
|---|---|--|
| Decreases the incidence of intra- and post-anaesthesia hypothermia | → | <ul style="list-style-type: none"> • Decreases post-operative recovery period • Assists the prevention of fluctuating blood pressure |
| Decreases vasoconstriction | → | <ul style="list-style-type: none"> • Improves vascular access by decreasing vasoconstriction • Better drug delivery perfusion • Improves blood flow, decreasing the incidence of surgical wound infection |
| Maintains normothermia | → | <ul style="list-style-type: none"> • Improves patient comfort, prevents shivering and associated increases in metabolic rate |
| Hand and feet warming | → | <ul style="list-style-type: none"> • Improves blood flow, allowing accurate SpO₂ assessment |
| Non-conductive and radiolucent | → | <ul style="list-style-type: none"> • Suitable for all electro-surgery/diathermy and radiographic techniques |
| Lightweight and flexible | → | <ul style="list-style-type: none"> • Can be draped on all parts of the body in conjunction with the sterile surgical field |
| Tight fitting to skin surface | → | <ul style="list-style-type: none"> • More effective than other warming systems when used in specific patient positioning e.g. lateral and stirrups positions |
| Latex free | → | <ul style="list-style-type: none"> • Can be used on latex sensitive patients |
| Inexpensive to use | → | <ul style="list-style-type: none"> • Simple and cost effective protection from patient hypothermia • Suitable for all patients |
| Customised product design | → | <ul style="list-style-type: none"> • Tailored designs to optimise insulation and access to surgical sites |



Key Performance

Benefits

Blankets



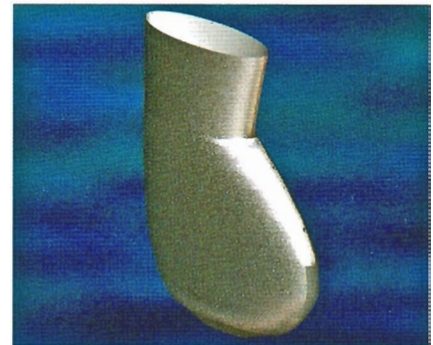
- Prevents heat loss from body
- Complements the use of active body warming techniques by placing Thermawrap* over active warming blankets* to radiate heat back to the patient
- Neck cut-out and shoulder flaps allow blanket to be tucked under the patient's shoulder
- Various lengths provide optimum skin surface coverage for warming effectiveness



Pulse Oximeter Mitt / Boot



- Ensures accurate SpO₂ readings where extremities such as toes and fingers are kept normothermic to maximise blood flow



Head Cover



- Prevents heat loss from the patient's head
- More effective and convenient than active systems in preventing head and neck heat loss¹
- Complements the use of body, leg and arm warming techniques
- Available in adult, youth and paediatric sizes



*See manufacturers of active warming systems.

¹Deacock S *et al.* Heat Retention Using Passive Systems During Anaesthesia: Comparison of Two Plastic Wraps, One with Reflective Properties. Br. J. Anaesthesia 1997. vol. 79: pp. 766-769

Hypothermia...

Exposing the Facts

- **...Hypothermia Develops Early**

Hypothermia develops during the intra-operative period partly as a result of disordered thermoregulation induced by anaesthesia, and partly because of the nature of the operation or injury and the surgical environment. Both the hypothermic state and the consequences of physiological attempts to return the core temperature to normal, which take place during the postoperative period, are associated with non-beneficial effects. Attempts to prevent an intra-operative decline in core temperature are a part of anaesthesia management. However, most of the traditional options available are inefficient or ineffective, especially if used as a single intervention and particularly in adults.¹

¹Jackson SA *et al.* Postoperative Management of Hypothermia of Intra-Operative Origin - Experience with a Forced-Air Convective Warming Device. *S. Afr. J. Surg.* 1997. Aug.; 35(3): pp. 134-138

- **...Hypothermia is Common**

Hypothermia (core temperature <36°C) is common after long-lasting surgical procedures. Heat loss mainly occurs during anaesthesia and surgery and leads to increased risk, especially in the early recovery period of elderly patients.²

²Kaudasch G *et al.* The Effect of Convection Warming During Abdominal Surgery on the Early Postoperative Heat Balance. *Anaesthetist* 1996. Nov.; 45(11): pp. 1075-1081

- **...Hypothermia Triggers Many Physiological Problems**

Anaesthetised surgical patients frequently become hypothermic, because of decreased metabolic heat production, increased heat loss, surgical exposure and dry respiration gases. Intraoperative hypothermia may trigger postoperative protein breakdown, shivering, myocardial ischemia and many other problems. For that reason, heat conservation is a major anaesthetic management.³

³Sato Y *et al.* Efficacy of Warm Touch Warming System for Hypothermia. *Masui* 1997. Dec.; 46(12): pp. 1625-1629

- **...Hypothermia can be Prevented Using Thermawrap®**

Core body temperature, which is normally regulated to within a few tenths of a degree centigrade, varies as much as 6°C during anaesthesia. Hypothermia is a typical disturbance resulting from anaesthetic-induced inhibition of thermoregulatory control combined with exposure to normal-to-low ambient temperatures. All intravenous and inhaled anaesthetics so far tested as well as regional anaesthesia techniques markedly impair thermoregulatory control. The pattern of impairment is similar in each case: warm-response thresholds are elevated while cold-response thresholds are reduced. The result is a 20-fold increase in the interthreshold range (core temperatures not triggering autonomic thermoregulatory responses). **Even mild perioperative hypothermia causes numerous complications, and is an integral part of anaesthetic management but can be easily prevented using available techniques.**⁴

⁴Kurz A. Intraoperative Hypothermia: Pathophysiology and Clinical Sequelae. *Wien Klin Wochenschr* 1997. Apr. 25; 198(8): pp. 261-269

The Consequences of Mild Hypothermia

Mild perioperative hypothermia is a common, but avoidable, consequence of combining anaesthesia with a normal-to-low ambient environmental temperature. In most cases it predisposes the patient to potentially acute complications.

Both regional and general anaesthesia techniques markedly impair the normal regulation of core body temperature. Consequently, inadvertent perioperative mild hypothermia is common.

Hypothermia develops because the typical operating room environment may be cool; however, it is anaesthetic-induced impairment of thermoregulatory responses that contributes most. Internal redistribution of body heat is an important factor, contributing more to core hypothermia than net heat loss in most patients.

There is now convincing evidence that a typical amount of intraoperative hypothermia predisposes numerous complications and can alter patient outcome. Fortunately, effective methods are available for preventing hypothermia.¹

Effects of Hypothermia

- Shivering
- Hypoventilation
 - Impaired drug **metabolism**
 - Prolonged **bleeding**
 - Reduced **blood coagulation**
 - Increased **risk to surgical wound infection**
 - Increased **risk of potential airway obstruction**
 - **Impairment of numerous immune defences**
 - **Prolonged post-anaesthesia recovery**
 - **Extended hospitalisation**

Current Awareness of Hypothermia

Prevention of hypothermia is rapidly gaining credibility as a means of eliminating some of the post-operative complications that have, for so long, been an acceptable part of the overall surgical and anaesthetic technique.

Clinical studies show the prevalence of mild hypothermia among normal patient populations. The widespread adoption of active patient heating systems, such as warm air circulation and electrical heating pads, is cautioned by occasional misuse of these systems.

There have been reports that active warming devices are a potential source of nosocomial infection, in which the air-intake filters are not changed as required, which can lead to colonisation of micro-organisms such as staphylococcus xylosus and corynebacterium¹.

Proper maintenance of filters can prevent entrainment of bacterial and fungal pathogens but may not prevent colonisation of these pathogens within the apparatus, distal to filters.

In today's multi-drug environment, where bacterium strains are becoming more resistant to conventional drugs, the use of Thermawrap[®] eliminates the potential for introduction of bacteria. In Deacock's work² on pre-operative patients with mean core temperature of 35.8°C, a Thermawrap[®] -equivalent product was fitted pre-operatively to all parts of the body, excluding surgical and IV sites. Core temperature was held stable for 2 hours and then showed an increase to a peak of 37.3°C at 7 hours.

This confirms that Thermawrap[®] prevents heat loss and uses humidity between drape and skin surface to build insulation which warms the patient during the latter part of surgery, by preventing moisture-evaporative heat loss.

Research³ indicates that covering the head and face is effective in preventing loss of core temperature. Therefore, the use of Thermawrap[®] head covers with Thermawrap[®] body blankets or an active heating system is indicated.

Further Reading

There are number of publications supporting the use of Thermawrap[®]. The following are referenced for your further reading:

Avidan MS et al. Convection Warmers - Not Just Hot Air. *Anaesthesia* 1997. vol. 52. pp. 1073 -1076

Deacock S et al. Heat Retention Using Passive Systems During Anaesthesia: Comparison of Two Plastic Wraps, One with Reflective Properties. *Br. J. Anaesthesia* 1997. vol. 79. pp. 766 -769

Lilly RB et al. Inadvertent Hypothermia: A Real Problem. *ASA Refresher Courses in Anesthesiology* 1987. vol. 15

Murphy MT et al. Reduction of Perioperative Heat Loss Using a Reflective Drape. *American Society of Anesthesiologists and the American College of Surgeons' Annual Meeting* 1986

¹Avidan MS et al. Convection Warmers - Not Just Hot Air. *Anaesthesia* 1997. vol. 52. pp. 1073-1076

²Deacock S et al. Heat Retention Using Passive Systems During Anaesthesia: Comparison of Two Plastic Wraps, One with Reflective Properties. *Br. J. Anaesthesia* 1997. vol. 79. pp. 766-769

³Kamitani et al. Covering the Head and Face Maintains Intraoperative Core Temperature. *Can. J. Anesthesia* 1999. vol. 46: 7. pp. 649-652

Some Frequently Asked Questions

Which patients should Thermawrap® be used on?

Thermawrap® is indicated for all patients susceptible to mild hypothermia. As Thermawrap® is inexpensive and requires no training it can be used on all patients.

When should the patient be covered with Thermawrap®?

Patients begin losing body heat pre-operatively, therefore, Thermawrap® is most effective when placed before anaesthesia induction or preferably in the hospital ward.

Can Thermawrap® be used during surgery?

Yes. Thermawrap® is non-conductive and radiolucent making it safe for use with all electro-surgery/diathermy and all radiographic techniques.

Can Thermawrap® be used in conjunction with an active warming system?

Yes. Thermawrap® should be placed over the active warming blanket where it will radiate convective heat loss back to the patient.

Which side goes toward the patient?

The fleece side is towards the patient as it is more comfortable for the patient and will drape better.

Are some body areas more important to cover than others?

Some parts of the body lose a disproportionate amount of heat.

The head is more vascular and loses more heat than the arm.

Body extremities, such as arms and legs, are less vascular than the head but could still be vasoconstricted.


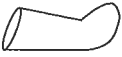
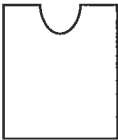





This has implications for pulse oximetry and vascular access. For these areas head covers, mitts and boots are available.

How can I verify that Thermawrap® is working?

Use intermittent tympanic temperature measurements along with noting the absence of shivering and vasoconstriction.

Ordering Information

Thermawrap® is individually packaged in sealed transparent bags and conveniently dispensed from specially designed boxes

	Product Code	Product Description	Box Quantity	Outer Case Quantity
	AMTW1000	Adult Head Cover	30	90
	AMTW1010	Paediatric Head Cover	100	300
	AMTW1020	Youth Head Cover	40	120
	AMTW1100	Legging x 1	40	120
	AMTW1200	Blanket, 600 x 600 mm (2' x 2')	100	300
	AMTW1300	Blanket, 1200 x 1200 mm (4' x 4')	30	90
	AMTW1400	Blanket, 2100 x 1200 mm (7' x 4')	15	45
	AMTW1600	Jacket	20	60
	AMTW3000	Pulse Oximeter Mitt x 1	80	240
	AMTW3050	Pulse Oximeter Boot x 1	80	240
	AMTW2000	Procedure Pack : blanket x 1, 1200 x 1200 mm (4' x 4'), legging x 2 & adult head cover x 1	10	30
	AMTW2100	Blanket x 1, 2100 x 1200 mm (7' x 4') & Adult Head Cover x 1	10	30

Meeting your patients' needs...

The above products can be combined as part of a kit or designed to patient requirements

ten

WARNING:

- For infection control we recommend that Thermawrap® is not reused on subsequent patients
- If soiled during surgery dispose of with regular contaminated waste
- If re-cutting blankets to size, ensure that no fragments of material contact the surgical site or sterile field

All Armstrong Medical products are manufactured to quality systems under BS EN ISO9000, ISO13485, EN46000 and EC Directive 93/42/EEC



CE

NON
STERILE


LATEX
FREE

*Creating
Support
for Life*



Thermal Insulation for Surgical Patients

Armstrong Medical manufacture a complete range of products for anaesthesia and critical care applications. For supply of these products, or any product within the Armstrong Medical range, please contact your local representative.



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