

CarbonCool® System – Hypothermia Therapy after Cardiac Arrest

Portable & Rapid Surface Medical Cooling Device



OVERVIEW

- Indication & Field of Application
- Product description and performance
- CarbonCool® System – MPad™
- Demonstration on the use of MPad™ with CarbonCool® Pad Holders (Chest, Abdomen & Thighs)



INDICATION AND FIELD OF APPLICATION



INDICATIONS & REGISTRATIONS

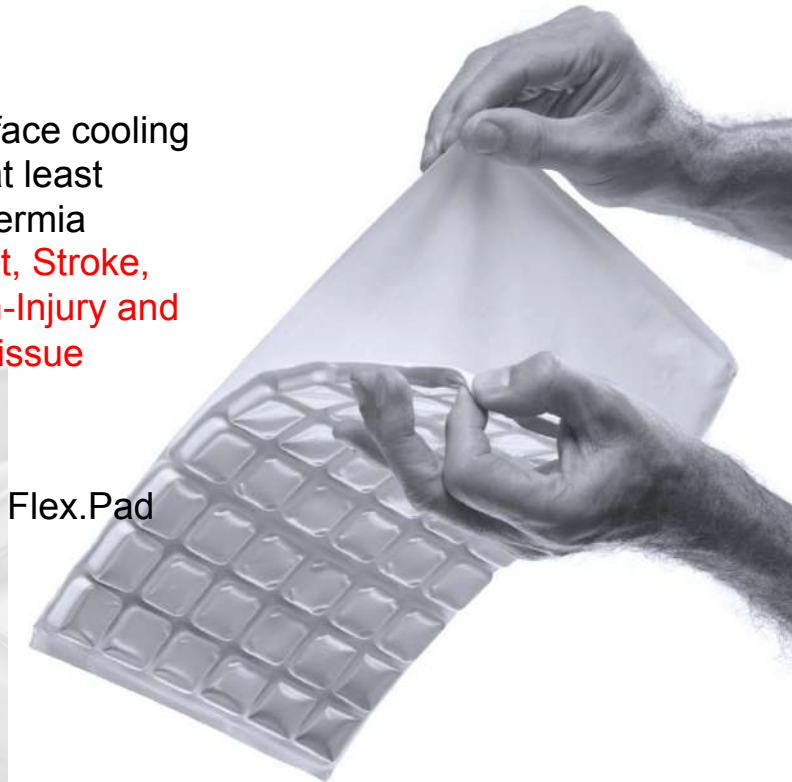
EMCOOLS Flex.Pad™ – The product

European Union:

- The EMCOOLS Flex.Pad is a skin-friendly, non-invasive surface cooling system that is used for temperature reduction in patients of at least 35kg body weight when therapeutic hypothermia or normothermia treatment is clinically indicated (**Hyperthermia, Cardiac Arrest, Stroke, Myocardial Infarction, Sepsis, Septic Shock, Traumatic-Brain-Injury and Fever as well as local pain relief in Blunt Trauma, e.g. Soft Tissue Injury, and Post- surgical Rehabilitation**).
- Note: For patients of less than 35kg body weight EMCOOLS Flex.Pad may only be used for normothermia treatment.

United States of America:

Temperature reduction in adult patients **where clinically indicated**, e.g. in hyperthermic patients.



PRODUCT DESCRIPTION AND PERFORMANCE

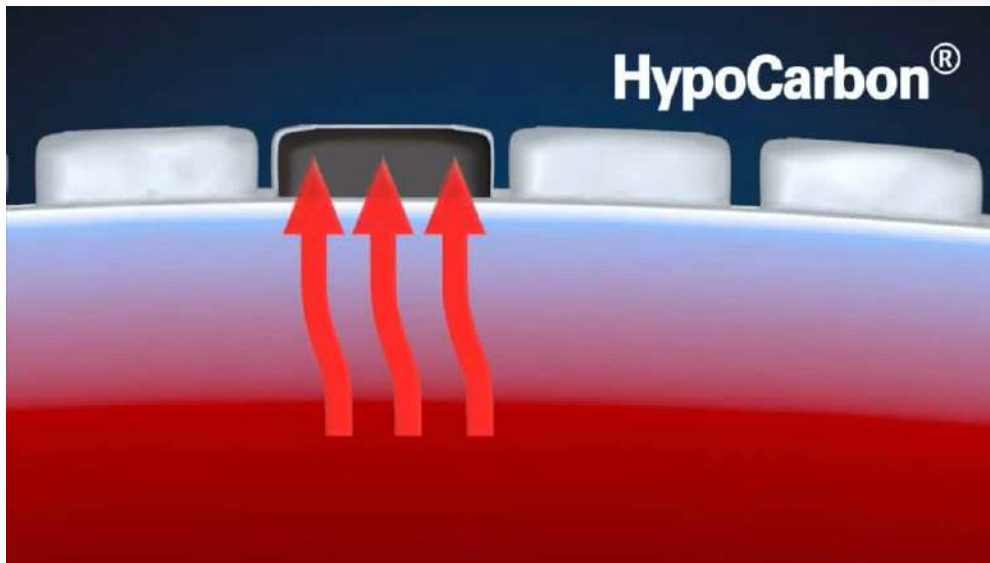


HYPOCARBON®

EMCOOLS Flex.Pad™ – The product

- * Worldwide unique and patented technology
- * Cooling rates (based on single use) of
 1. upto 3.3°C/h (Hypothermia Therapy After Cardiac Arrest)
 2. upto 6.6°C/h (Exertional Heat Stroke) – Singapore Army
- * Biocompatible material (skin- and environmentally friendly, non-toxic)
- * How Hypocarbon works?

Click of the image for a demonstration



HYPOCARBON®

EMCOOLS Flex.Pad™ – The product

- No insulation between pad and patient

- * Outstanding thermal conductivity

Ice/ Water

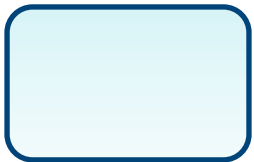


No uniform melting process

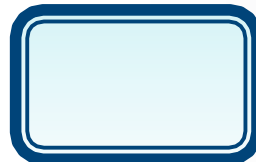


Melted ice insulates with a water layer between ice and patient

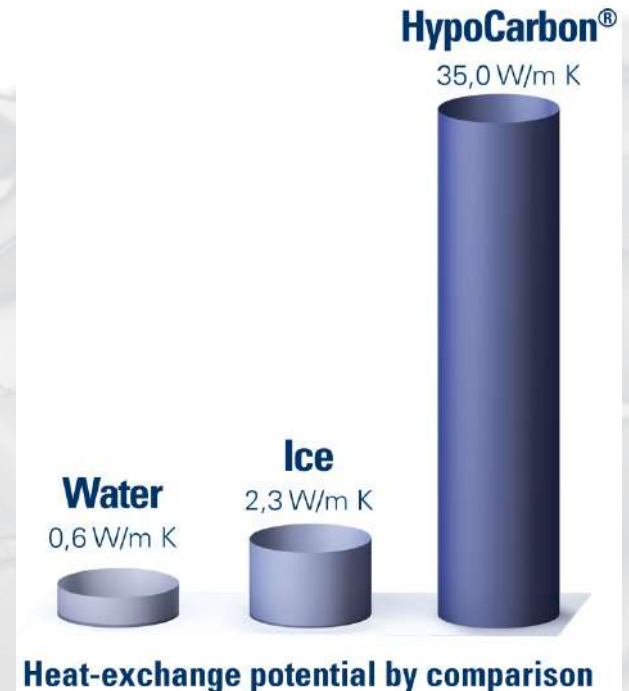
HypoCarbon®



Even melting process



No insulation thanks to HypoCarbon®



HYPOCARBON®

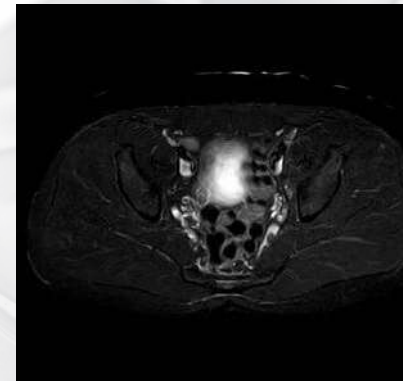
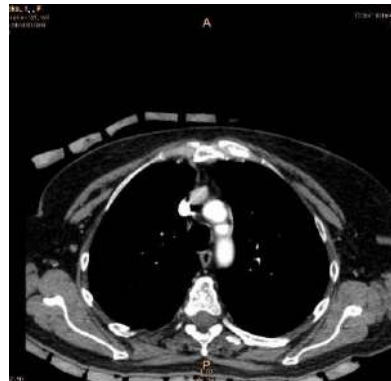
EMCOOLS Flex.Pad™ – The product

* Compatibility with imaging

1 X-Ray

2 CT

3 MRI



Note: EMCOOLS Flex.Pad™ can be used as well during angiography

Comparison of Cooling Rate



PMC full text: [Crit Care. 2012; 16\(Suppl 2\): A5.](#)
Published online 2012 Jun 7. doi: [10.1186/cc11263](#)
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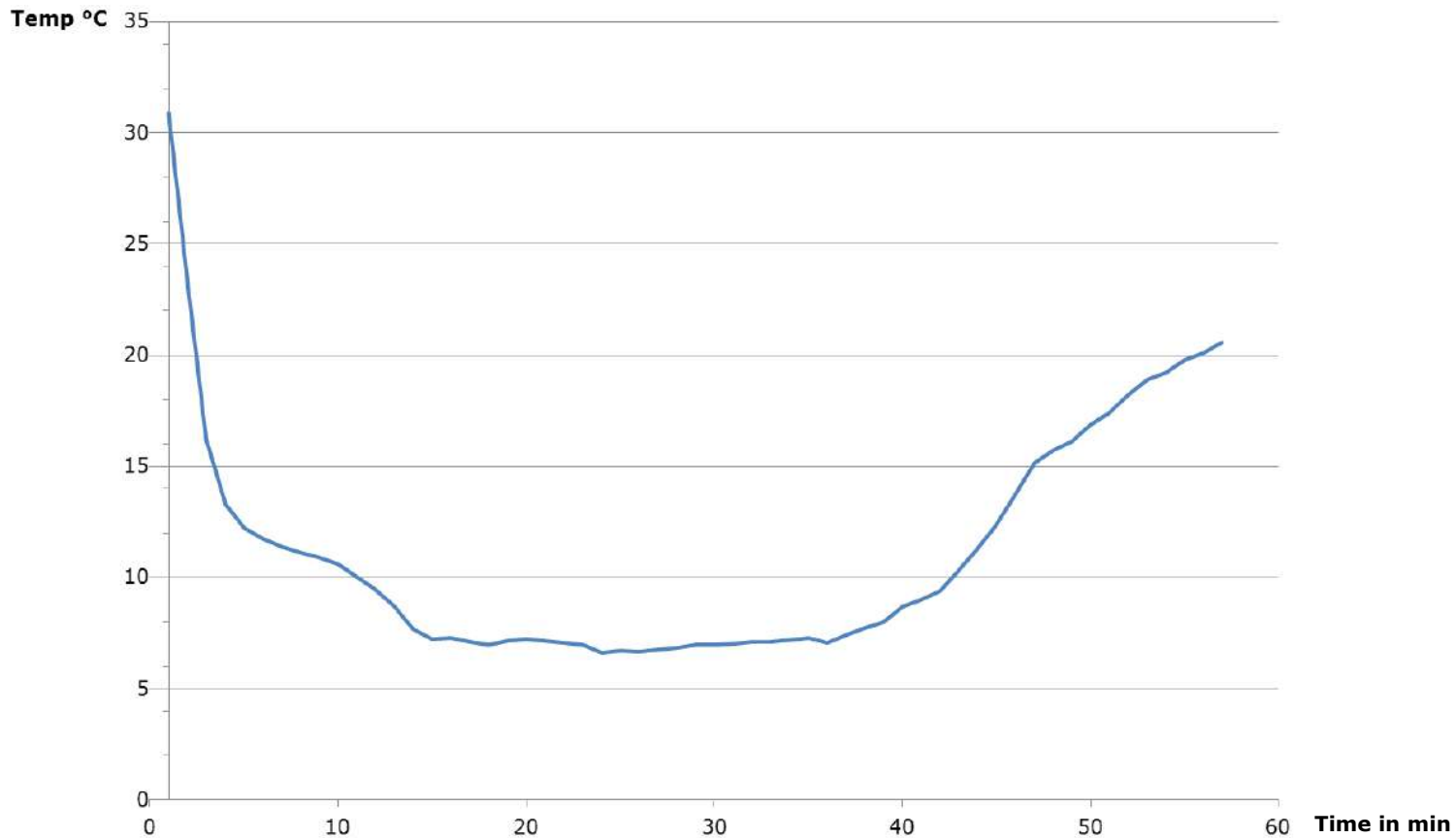
Table 1

Company	Device	Type of cooling	Cooling rate (°C/hour)	Auto feedback	Reusable
Philips	InnerCool RTx	Catheter	4.0 to 5.0	Yes	No
Zoll	Thermogard XP	Catheter	2.0 to 3.0	Yes	No
C.R. Bard	ArcticSun 5000	Surface adhesive pads	1.2 to 2.0	Yes	No
CSZ	Blanketrol III	Surface blanket	1.5	Yes	Yes
EMCOOLS	FLEX.PAD	Surface adhesive pads	3.5	No	No
MTRE	CritiCool	Surface blanket	1.5	Yes	no

EASY AND SAFE APPLICATION

SKIN TEMPERATURE

EMCOOLS Pad with Hypocarbon® Technology Skin temperature during product application



The skin temperature does not drop below 6 to 8°C

Source: Data on file at EMCOOLS

CarbonCool® System - MPad™

- MPad™ uses EMCOOLS HypoCarbon® Technology
- MPad™ is manufactured exclusively for Global Healthcare SG by EMCOOLS Medical Cooling System Ltd
- MPad™ can be cleaned with disinfectant

CarbonCool® System - MPad™

- MPad™ must be used together with CarbonCool® Pad Holders (CarbonCool® System)
- CarbonCool® Pad Holders (**in place of medical adhesive**) is designed to provide a snug fit to different anatomical parts of the human body

CarbonCool® Full Body Suit



CONTRAINDICATIONS FOR USING CarbonCool® SYSTEM (MPad™ with CarbonCool® Pad Holders)

- **None**
- **Not to use on patients with skin diseases, inflammation, burns or skin injuries**
- Temporary skin reactions may occur in very rare cases i.e. patients with hypersensitive skin.

MATERIAL USED FOR THE CarbonCool® PAD HOLDERS

- NEOPRENE
- VELCRO
- THERMOPLASTIC POLYURETHANE (TPU) FILM
- ALL MATERIAL USED ARE NON-STERILISED



BENEFITS OF USING THE CarbonCool® System

- Provides insulation against ambient heat/temperature (longer cooling duration)
- Enables firm contact with the patient's skin (more efficient thermal conductivity)
- Multiple use of the MPad™
- Easy and quick application
- Lowers treatment cost



WARNINGS

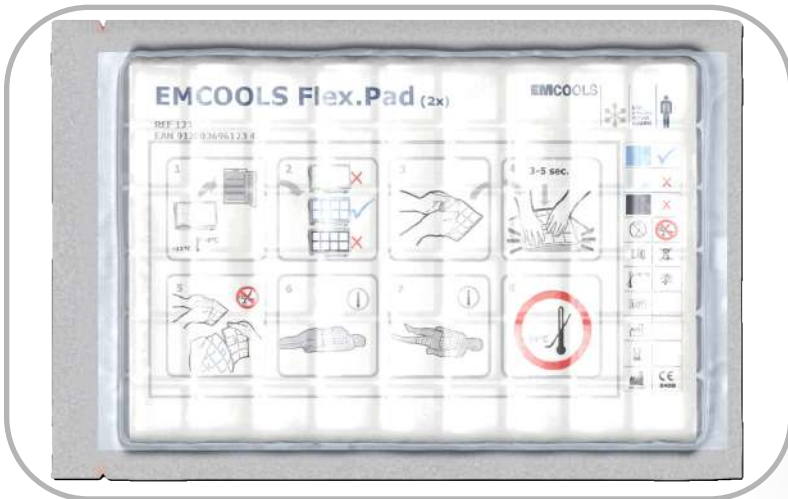
- **CarbonCool® System must not be used in case of skin diseases, inflammation, burns or skin injuries.**
- Skin condition has to be checked especially in patients with
 - poor tissue blood flow,
 - peripheral arteriosclerosis,
 - poor nutrition (diabetics, adipose patients) or
 - medication of e.g. blood pressure
- Temporary skin reactions may occur in very rare cases i.e. in patients with hypersensitive skin.

PRODUCT APPLICATION



HOW DO I STORE MPad™ FOR USE?

- Remove transport- and storage box.
- Place and store horizontally in a freezer at a temperature of **-8°C to -11°C**. for at least 24 hours



MPad™ With CarbonCool® Pad Holders



1. Remove the frozen MPad™ from the vacuum pack
2. Detach the velcro from each pocket of CarbonCool® Pad Holders
3. Insert each frozen MPad™ into the pocket of the CarbonCool® Pad Holders
4. Ensure the flat surface of the MPad™ inside the pocket is facing the TPU

MPad™ With CarbonCool® Pad Holders

5. Overlap the TPU with velcro over the MPad™
6. Ensure the MPad™ is fully tucked in, with the velcro firmly adhere to the neoprene of each pocket in the CarbonCool® Pad Holders
7. Repeat this process until all the pockets in the CarbonCool® Pad Holders are loaded with frozen MPad™
8. Now they are ready for immediately use or store in the Freezer as standby for future use

CarbonCool® Chest Pad

CarbonCool®
Intensive Surface Cooling System +



Step 1 :
Place the CarbonCool™ Chest Pad around
the user's chest from the back as shown



Step 2 :
Secure the CarbonCool™ Chest Pad with
the velcro strap



Step 3 :
Fasten the two of the shorter black straps
of the shoulder pieces to the back of the
CarbonCool™ Chest Pad as shown



Step 4 :
Bring the two longer black straps of the
shoulder pieces across the shoulders to
the front as shown

CarbonCool® Chest Pad

CarbonCool®
Intensive Surface Cooling System +



Front



Side



Back

CarbonCool® Abdomen Pad

CarbonCool®
Intensive Surface Cooling System +



Step 1 :
Place the operationally ready
CarbonCool™ Abdomen Pad horizontally
across the lower back as shown



Step 2 :
Place one side of the CarbonCool™
Abdomen Pad, which is without velcro
firmly around the abdomen



Step 3 :
Fasten the velcro firmly over the
CarbonCool™ Abdomen Pad



Step 4 :
Ensure a snug and comfortable fit

CarbonCool® Thigh Pad

CarbonCool®
Intensive Surface Cooling System +



Step 1 :
Place the CarbonCool™ Thigh Pad
horizontally across the thigh as shown



Step 2 :
Fasten the CarbonCool™ Thigh pad
around the thigh



Step 3 :
Secure the velcro strap down firmly



Step 4 :
Ensure a snug fit to prevent the
CarbonCool™ Thigh Pad from slipping

CarbonCool® Full Body Suit

CarbonCool®
Intensive Surface Cooling System +



HOW MANY MPad™ DO I NEED TO COOL ONE PATIENT?

- Average of 20 pieces MPad™ are required to be loaded into the CarbonCool® Pad Holders for each patient of about 65 kg
- Additional 3 pieces of MPad™ per 10kg additional body weight of the patient exceeding 65 kg
- Lower cooling capacity with fewer MPad™
- Remove CarbonCool® Pad Holders upon achieving body core temperature of 34°C (Hypothermia Therapy After Cardiac Arrest)



The attending physician is responsible for duration of cooling and the number of Flex.Pads used.

APPLICATION

Apply CarbonCool® Pad Holders with loaded frozen MPad™ to the body surface, on the chest, abdomen, back and thighs

Avoid the genital region, female breast tissue, toes, fingers and face and do not use the product on pregnant women.



As an approximate value the following **rule-of-thumb** has been well proven in various applications:

3 single MPad™s per 10 kg body weight

This is equivalent to a cooling rate of 3.3°C regardless of body size and weight.

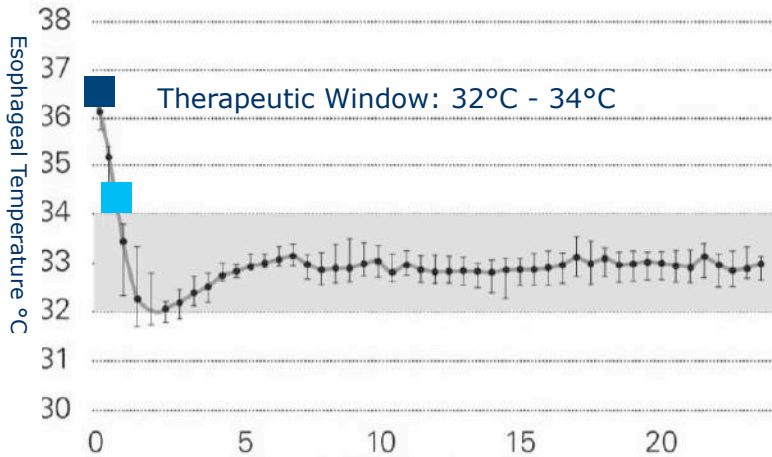


Check and re-check the patient's skin condition throughout the treatment. If warranted, use pressure relieving or pressure reducing underlay in order to prevent skin injuries. Antibacterial substances or liquids (e.g. disinfectants) must not be allowed to accumulate underneath the Flex.Pad™.

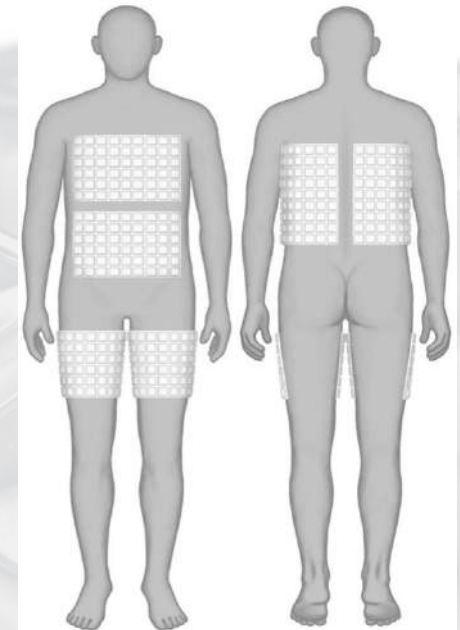
EMCOOLS COOLING THERAPY

INITIAL-COOLING

Initial-Cooling starts at a core body temperature of approx. 36,5°C and is finished at 34°C. **At 34°C all Flex.Pads Small (MPad™) and CarbonCool® Pad Holders have to be removed carefully.**



The Uray-Study (2008) shows, that the target temperature of 34°C has been reached within approx. 54 minutes.¹



Start Initial-Cooling
(Apply Flex.Pads)

End Initial-Cooling
(Remove Flex.Pads)

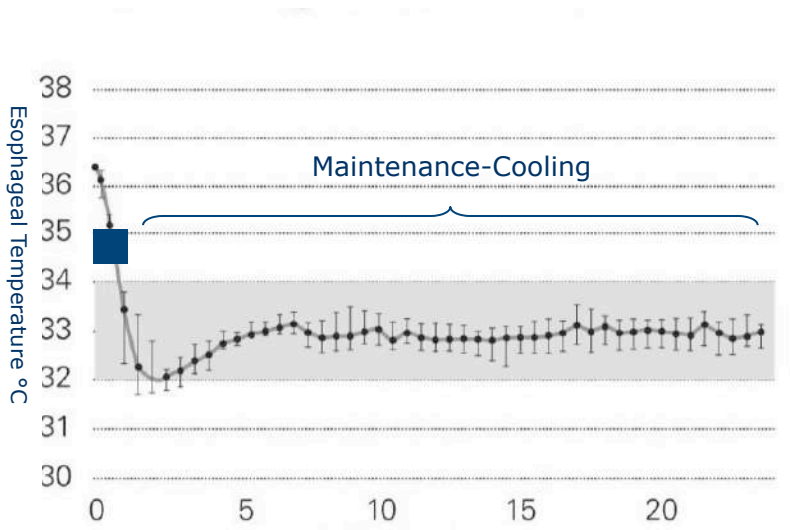


Should the core body temperature drop below 32.3°C at any point during initial cooling, the patient must be rewarmed to 32.4°C (e.g. with a heating blanket). The EMCOOLS Flex.Pad must not be re-applied more than once to the same area of skin within two hours.

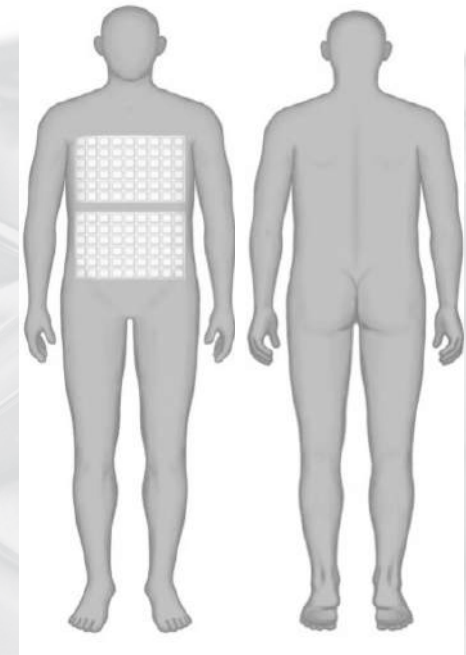
EMCOOLS COOLING THERAPY

MAINTENANCE-COOLING

Maintenance-Cooling starts at a core body temperature of 34°C.



The Uray-Study (2008) shows, that in rare cases two single pads have to be re-applied on chest and abdomen to maintain target temperature.¹



Start Maintenance-Cooling
(Do not apply any Flex.Pads on the patient)



Should the core body temperature drop below 32.3°C at any point during maintenance cooling, the patient must be rewarmed to 32.4°C (e.g. with a heating blanket). If the core body temperature climbs back to 33.5°C, 2 Flex.Pads have to be re-applied to the upper part of the body (on chest and abdomen). If the core body temperature reaches 33°C, all Flex.Pads must be removed. This process can be repeated as required.

HOW DO I MEASURE THE PATIENT'S TEMPERATURE DURING THE TREATMENT?

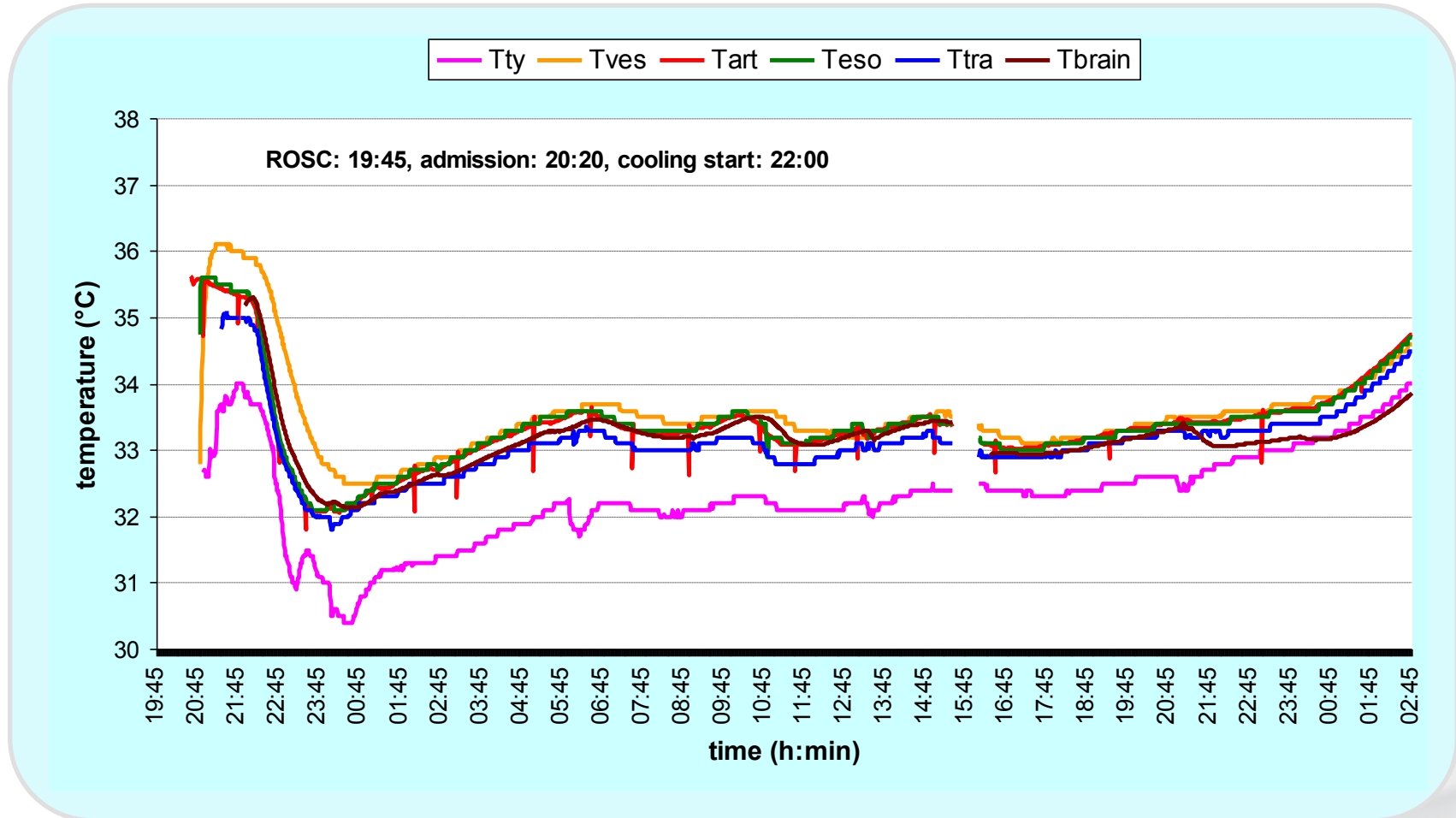
- CarbonCool® System can be used with all commercially available medical monitoring systems and all medical temperature probes
- EMCOOLS recommends **esophageal or tracheal** temperature measurements



The simultaneous use of the EMCOOLS Flex.Pad with other cooling or warming systems (e.g. cold infusions, water blankets etc.) requires precise and continuous monitoring of the core body temperature. Such a combination of different systems is implemented at the sole discretion of the attending physician; EMCOOLS assumes no liability whatsoever.

HOW DO I MEASURE THE PATIENT'S TEMPERATURE DURING THE TREATMENT?

Temperature measurement sites by comparison



Tty - tympanic temperature; **Tves** - temperature in the urinary bladder; **Tart** - temperature in the (pulmonary) artery; **Teso** - esophageal temperature; **Ttra** - tracheal temperature; **Tbrain** - temperature in the brain

DISPOSAL OF USED OF THE MPad™

- Used & Expired/Punctured MPad™: dispose of with contaminated medical waste (risk of bacterial or viral contamination)
- Unused MPad™ & Expired: Required no special disposal (environmentally friendly)



SIMULTANEOUS COOLING

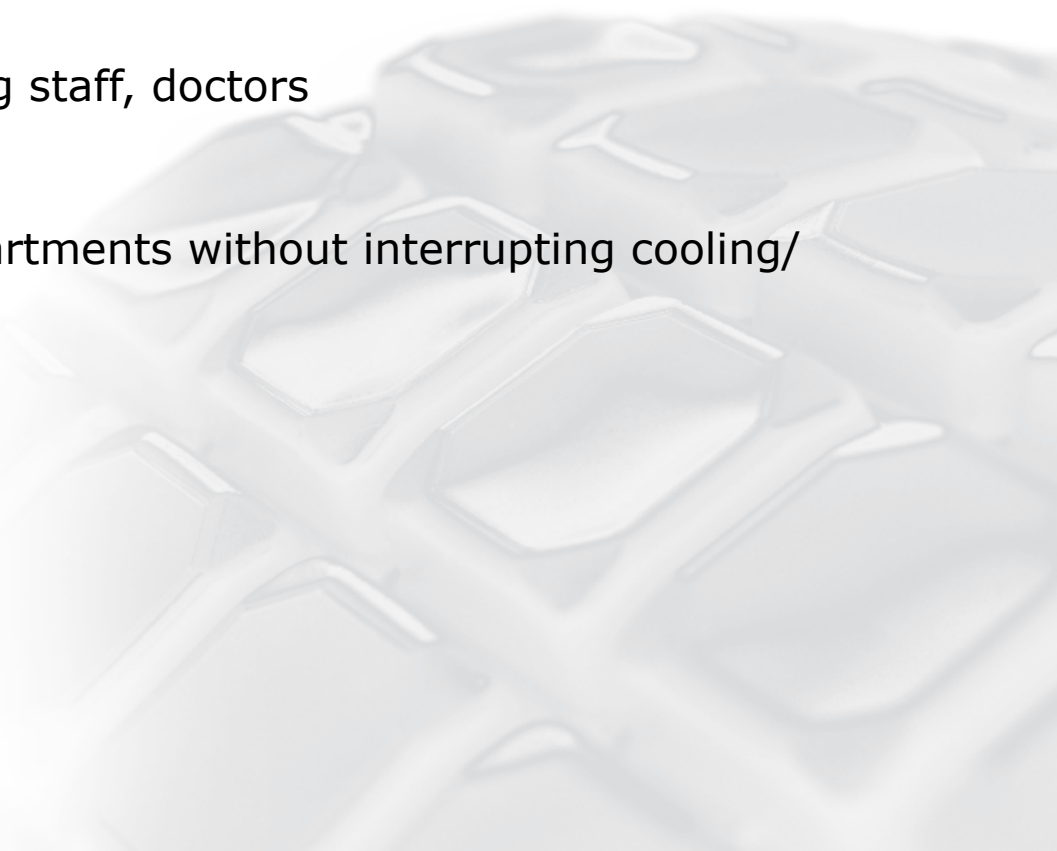
Stationary machines can only be used for **one patient at a time**



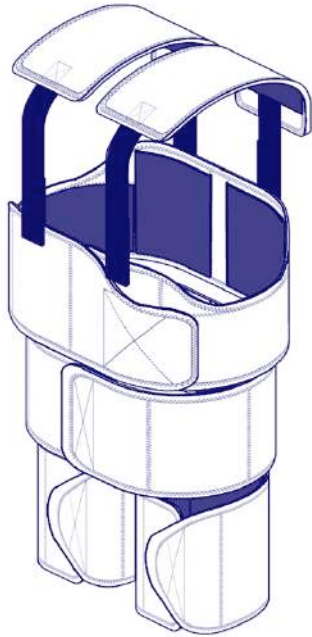
With MPad™ & CarbonCool® Pad Holders **several patients can be cooled simultaneously**



BENEFITS of CarbonCool® System

- 1. Effective and low costs cooling**
for local temperature reduction (fever reduction for neuroprotection)
 - 2. Fast & Easy to use**
for patients, paramedics, nursing staff, doctors
 - 3. Mobility and availability**
moving patients to different departments without interrupting cooling/
hypothermia therapy
 - 4. Safety and compatibility**
proven
- 

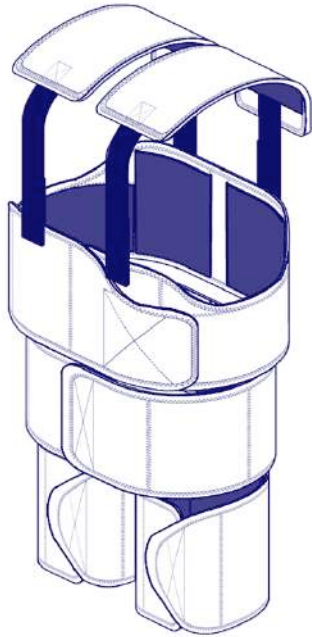
SERVICE & SUPPORT



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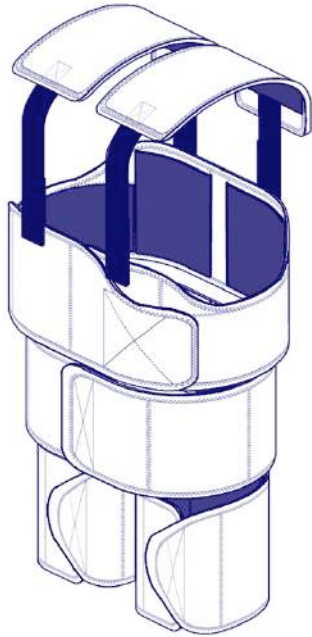
E: info@globalhealthcare.sg

CarbonCool® System



**QUESTIONS
& COMMENTS**

CarbonCool® System



THANK YOU

