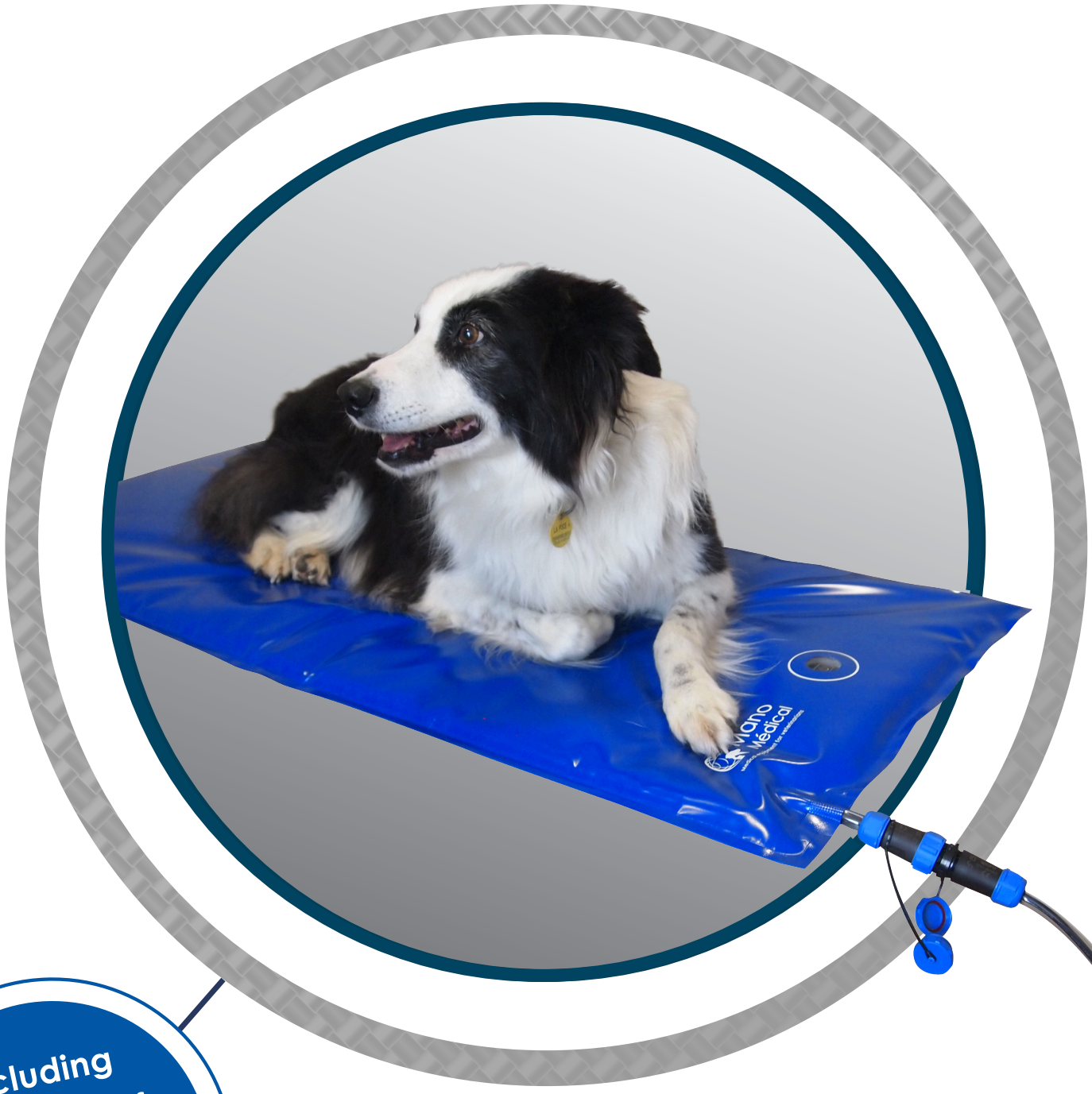
Management of Hypothermia



Including Guideline of CarbonTech Heating Mat

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MANAGEMENT OF HYPOTHERMIA

What is hypothermia?

The term hypothermia is used to describe a warm-blooded animal's temperature when it has decreased below its normal values, so that its vital functions may be impaired.

Example for a cat or a dog:

Causes of hypothermia may include:

- Trauma
- Anaesthesia
- Surgery, ….

Hypothermia may have dramatic consequences such as severe damage caused to vital organs, and in some cases, even death of the animal.
The smaller the animal, the greater the risk of hypothermia.

When should we use preventive warming?

An animal's temperature will typically drop during a surgery with anesthesia.
The degree of temperature drop depends on the size of the animal, age, coat/fur, type of anesthesia used, on the length of the procedure and on how invasive the procedure may be.

Whatever the method is used to warm the animal, the principle is the same: to supply the animal with energy.

How to determine whether the animal needs a warming solution?

The answer is simple: the decision must be based on monitoring the animal's body temperature.
A quick orthopedic procedure on a big dog will not cause the temperature to drop as quickly as a one-hour open abdominal surgery on a small cat.

How to monitor the body temperature?

Monitoring the body temperature means measuring it at regular intervals. It can be performed either with a classic thermometer or with a probe connected to the multiparametric monitoring system.

Which measurement site?

The rectal temperature can be taken but it does not represent a reliable indication of the true physiological situation of the animal. It may drop quickly when the animal's rectum is dilatated because of anesthesia, and the temperature of the rectal zone is not regulated in priority by the animal's body.

When possible, the best way to measure central temperature is by using an esophageal probe. This probe will transmit all significant fluctuations of the animal's central temperature with better precision and reactivity, therefore providing a better measurement of the actual physiological state of the animal.

Safety guidelines to warm efficiently:

Animals with hypothermia need to be rewarmed, but the process should occur gradually. This gradual warming helps to avoid excessive warming, which would provoke hypothermia.

We must also make sure that the pet is «warm» not «hot» and will not favor appearance of burns.

The equipment used to warm the pet must not present a risk of inducing other issues, such as mechanical or electrical hazards. Please review following safety guidelines thoroughly prior to use any warming material.

Mitigation of the risk of hyperthermia:

The most important thing to consider when mitigating the risk of hypothermia for any pet is to monitor the animal's temperature.
If an animal's temperature is above 100.4°F / 38°C, it does not need to be warmed.
If an animal does need to we warmed during or after a procedure however and it is being covered while using warming material, it is important for the pet's temperature to be monitored closely so that excessive heat does not accumulate under much cover.
The same principle applies to any animal that may be in a cage as well. The cage must be well ventilated to prevent heat accumulation during warming solution use. It is recommended to continuously monitor the animal's temperature to avoid excessive warming thereby alleviating potential hyperthermia.

Avoiding bedsores:

When an animal stays in the same position for an extended period, its body weight puts pressure on tissues and joints. This creates the potential for painful bedsores (for example: a dog lying on the spine will compress the skin between the spine and the table. In such a situation, tissues are compressed and blood flow may be partially or totally blocked in the area, causing necrosis of the tissues.)
This risk may be even high with some anesthesia protocols that induce a lowered blood pressure (ischemia).
Several risk factors may cause this to occur more frequently such as the pet's age, coat or general overall clinical health of the pet.
Other circumstances that may lead to bedsores include:

- Long exposure of the compressed zone to liquids
- Warming of the compressed zone

Avoiding burns:

They are a host of various warming solutions that have been utilized for pets that have not neccesarily been developed to meet the specific needs of animals. Warming solutions for animals should be based on the study of temperature curves so they safely integrate features adapted for animals.
To warm an animal without risk, the contact temperature between the animal and the warming solution should not exceed 107.6°F / 42°C for more than 15 minutes, for a healthy animal. This is assuming there is no compression points, maceration and/or no specific pathologies that would favor necrosis of a zone that may be made worse by the heating.

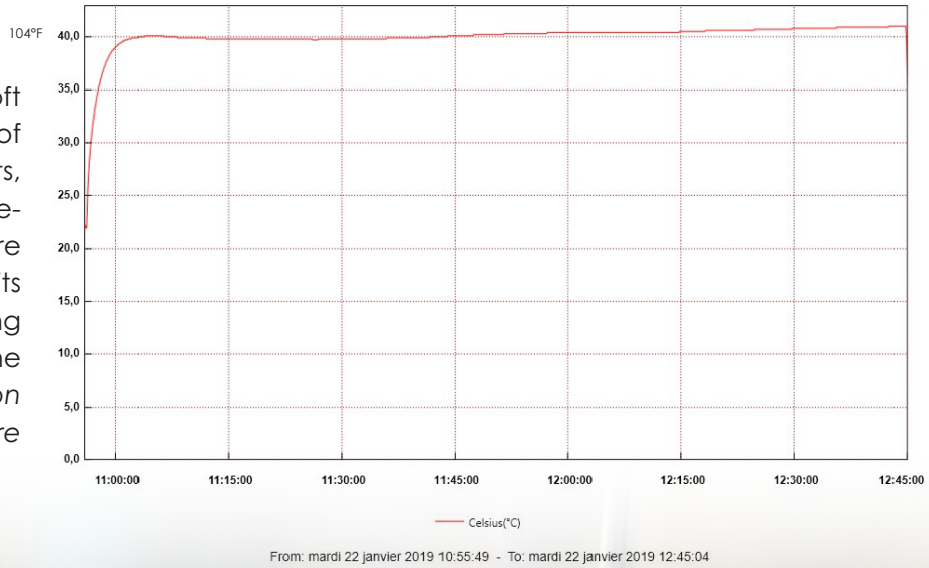
To sum up

To avoid burns and necrosis, it is imperative to avoid long term compression points and maceration of tissues. It is also important to always take into account the unique physiological presentation of the animal.

When the animal is heavy and tissues are compressed for a long time or skin macerates in liquids during warming to avoid hypothermia, there is an increased risk of burns, bedsores and possible necrosis.

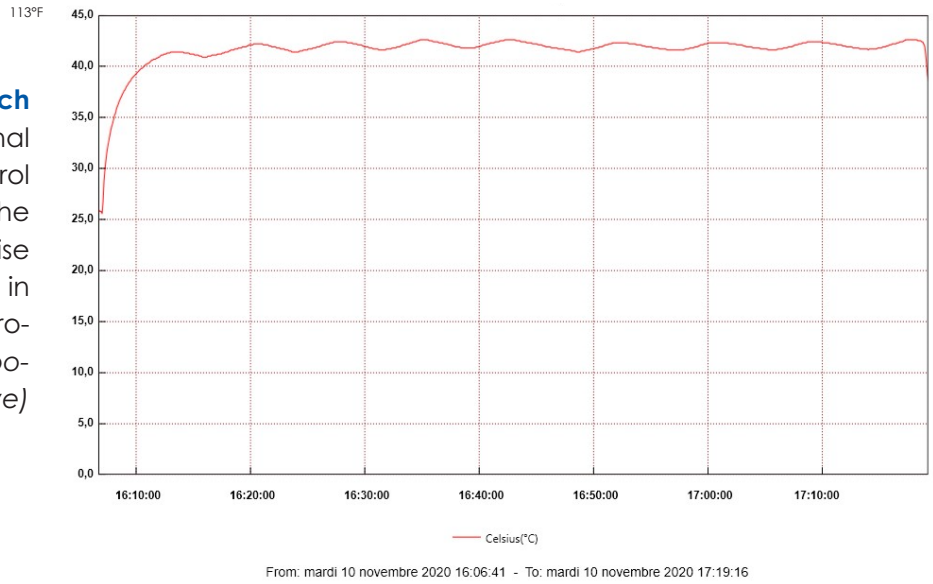
CarbonTech V1 and **CarbonTech V2** minimize the risk of burning the animal thanks to their softness and to the absence of rigid heating elements!

The **CarbonTech V1** is a soft mat which minimizes the risk of creation of compression points, while providing an homogenous warming on its entire surface. This allows to optimize its warming power while maintaining the contact temperature below the bar of 107.6°F / 42°C . *(As shown on the opposite sample temperature curve)*



Carbon Tech V2
The new generation of heating mats!

The heating mat **CarbonTech V2** integrates an additional contact temeprature control mechanism preventing the contact temperature to rise above 107.6°F / 42°C even in the case of misuse of the product. *(As shown on the opposite sample temperature curve)*



Electrical hazard:

CarbonTech V1 and **V2** warming mats run on safe low tension (24V), to mitigate electrical hazards. They are extremely resistant to all physical damage that may be caused by an animal, thereby protecting internal components. While it is highly unlikely, we recommend discontinuing use of the mat should it be damaged in any way. Cleaning or disinfection products, as well as physiological liquids that may come into contact with internal components may create an electrical hazard.

Is it possible to use the CarbonTech mats for animals other than dogs and cats?

CarbonTech heating mats can be used for species other than dogs and cats.
However, use for a species other than dogs and cats must be done under the care of a licensed veterinarian familiar with the metabolic specificities of those animals. This ensures that the appropriate safety guidelines will be followed to avoid hyperthermia or low temperature burns.

Safety guidelines for a heating mat:

☑ **Do not fold the mat:** this may drastically increase the quantity of energy delivered to the animal per unit of contact surface.

☑ **Do not use the heating mat on a surface made of insulating material that may accumulate heat** (for example: a vacuum mattress filled with polyester, which not only withholds heat but also increases the contact surface).

☑ **For the CarbonTech V2: in addition to the guidelines above, make sure that the animal is positioned on the temperature sensor, shown by the target symbol on the surface of the mat.** In this case, the temperature detected by the sensor may be significantly lower than the actual contact temperature, as it will measure the contact temperature between the mat and the surrounding air. Then the electronic regulation of contact temperature will not be operational.

In summary, how to warm up an animal safely?

✔ The choice of the heating mat:

- It must have been developed specifically for veterinary use and its temperature curves must have been studied so that the contact temperature will not rise above 107.6°F / 42°C for a long time.
- It must be flexible enough to mitigate the risk of creating compression points that may cause ischemia, necrosis and bedsores.
- It must warm homogeneously over its whole surface.

✔ It is mandatory to follow the safety guidelines of the mat to not create artificially any hot spots:

- Do not fold the mat.
- Do not use the heating mat on a surface made of insulating material that may accumulate heat.
- Maintain the contact surface as dry as possible
- Avoid all contact with metallic elements

✔ A heating mat equipped with an electronic contact temperature regulation system will provide additional security.

Solutions offered by Mano Médical :

CarbonTech V1

CarbonTech V1 is a warming device specifically developed to warm up cats and dogs, both during and after surgery.

- It runs on safe low voltage, limits the risk of creating compression points, resists to scratches and bites and is very easy to clean and disinfect.
- It uses a carbon fabric technology that allows to warm homogenously over the entire surface, without creating compression points.

This carbon fabric does not wear out and comes with no expiration date.

- This mat exists in two sizes: cage (Dim.: 62x52cm/24.40x20.47'') and table (Dim.: 112x52cm/ 44.09x20.47'').
- It warms continuously with a pre-defined power to ensure an efficient warming and a contact temperature just below the safety threshold, thus preventing the mat from burning the animal in standard conditions of use.
- The **CarbonTech V1** integrates a mechanical safety mechanism (a fuse) that will stop the warming in the case of high contact temperature stable for a long time.

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CarbonTech V2

► The **CarbonTech V2** is the evolution of the **CarbonTech V1**, thus using the same carbon fabric technology and also a safe low voltage. It also exists in both sizes (cage and table).

The CarbonTech V2 brings in new features:

- **A waterproof power block disconnection system** which makes the cleaning easier.
- **Three levels of power** that can be easily selected to adapt to all situations (50%, 80% or 100%). For example, the 50% power may be used for an animal recovering after surgery in its cage and presenting only mild hypothermia.
- **An electronic temperature regulation system** that will manage the contact temperature between the surface of the mat and the animal's skin by limiting it to 107.6°F / 42°C at the most, thus even better mitigating the risk of burning the animal even if the safety guidelines are not followed correctly.
- **An even more efficient warming** because the temperature regulation system allows to use a higher power and achieve the optimal warming contact temperature even quicker.

Comparison table	CarbonTech **V1**	CarbonTech **V2**
Table size (112 x 52 cm / 44.09 x 20.47'')	✓	✓
Cage size (62 x 52 cm / 24.40 x 20.47'')	✓	✓
Safe low voltage 24 V	✓	✓
Resistant to bites and scratches	✓	✓
Carbon fabric technology	✓	✓
Homogenous warming	✓	✓
Mechanical security device	✓	✓
Waterproof	✓	✓
Flexible: prevents compression points	✓	✓
No expiration date	✓	✓
Single warming power setting	✓	
Detachable power block for secure cleaning	-	✓
Power block equipped with Velcro to be attached under surgery table	-	✓
Three power settings (50, 80 & 100%)	-	✓
Electronic temperature regulation system	-	✓
5-year warranty against bites and scratches	✓	✓

Need a presentation or an advice ? Contact us!

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Or contact your local distributor!

Ce guide pratique est également disponible en français.

Scannez et découvrez !

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