epidermal radioisotope therapy

OncoBeta® Application System

Rhenium-SCT® procedure

System user manual
English

OncoBeta® GmbH

CE

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Contact information

OncoBeta® GmbH
Schleißheimer Straße 91,
85748 Garching
Germany
Tel. +49 (0) 89 - 32667330
Fax +49 (0) 89 - 326673399
Email: info@oncobeta.com
Website: www.oncobeta.com
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1 Introduction

This user manual is intended solely for qualified personnel. The product may only be used by **qualified medical personnel who have been trained** by OncoBeta® GmbH or sister organizations of OncoBeta® GmbH or its certified sales partners.

PLEASE NOTE

If applicable, national regulations must be taken into account when selecting the personnel who will be authorised to use the product.

This user manual applies to the **OncoBeta® Application System** and its use during the **Rhenium-SCT®** procedure. The instructions for using the other products needed to carry out the procedure must also be observed.

Before using this manual, check the page numbers to ensure that the document is complete. Please contact the manufacturer if this manual or the labelling on the product is incomplete.

Throughout this manual, the products and the product components are referred to by the same names given to them in Chapter 3 “Description”.

1.1 The Rhenium-SCT® procedure

The Rhenium Skin Cancer Treatment (Rhenium-SCT®) with Rhenium-188 is used as a non-invasive method for treating non-melanocytic skin cancers. During treatment, the affected area of the skin is covered with the sterile protective foil. Rhenium-188 is then applied in a matrix **(OncoBeta® Rhenium-188-Compound)** on the foil in the area of the tumour including a safety margin. The irradiation time required to achieve the desired target dose at the defined penetration depth is calculated based on the radioactivity of the substance being applied and the surface area to be treated. After the irradiation time has come to an end, the radioactive matrix is removed by pulling the foil from the skin. The matrix hardens during the treatment process and forms a flexible film on the foil covering the skin.

The beta radiation means that the dose falls exponentially as the penetration depth increases, protecting deeper layers of tissue. This generally makes it possible to administer a lethal dose to the tumour in a single course of radiation without damaging deeper layers of tissue.

Rhenium-188 has a half-life of 17 hours and radiates with a beta decay energy of maximum 2.12 MeV, which allows to treat lesions up to a depth of 3 mm. Due to the relatively fast decay of Rhenium-188, the activity of the **OncoBeta® Rhenium-188-Compound** on delivery changes depending on the production and the time needed for delivery. Additionally, the activity might be limited to a certain value on delivery, if the institute receiving the activity has a limited license for handling Rhenium-188. The variance in the activity is compensated by the duration of the irradiation time. The irradiation time is calculated during the treatment depending on the activity of the applied Rhenium-188-Compound on the lesion, target radiation dose (commonly 50 Gy), target treatment depth and area of the lesion. Normally, a delivered carpoule has an activity between 0.6-2.2 GBq, which allows the treatment of a lesion between 45-180 minutes. Please read the section “4.8 Calculating the irradiation time” for more information.

1.2 Areas of application for the Rhenium-SCT® procedure

1.2.1 Intended Use

The Rhenium Skin Cancer Therapy (Rhenium-SCT®) is intended to be used to treat skin cancer using the radioisotope Rhenium-188.

1.2.2 Indications

The Rhenium-SCT® is indicated for:

- Basal cell carcinoma (BCC)
- Squamous cell carcinoma (SCC)

in patients with co-morbidities for which a surgical approach is not indicated or reject it, or for lesions whose anatomical position may result in a suboptimal cosmetic result using conventional approaches, or where conventional therapies have failed and the Rhenium-SCT® is used as ultima ratio.

1.2.3 Contraindications

Following the recommendations of contraindications for brachytherapy by ESTRO (GEC ESTRO Handbook of Brachytherapy – European Society of Therapeutic Radiology and Oncology, August 2002), the Rhenium-SCT® is contraindicated in the following cases:

- Malignant Melanoma
- Skin tumors that involve nerves or bony structures
- Lesions of the upper lid
- Confirmed pregnancy or impossibility to rule out a pregnancy
- Illnesses which require medication which suppresses significantly wound healing or the immune system
- Patients under 18 years
- Existing major circulatory disorders in the region to be treated

1.2.4 Possible side effects

Within the experience with the device and its preceding investigational version, no side-effects have been reported beyond the local reaction to the treatment, however the available data cannot rule out that similar side-effects as conventional brachytherapy may occur. According to the GEC ESTRO Handbook of Brachytherapy such can be:

- Redness of skin
- Inflammations
- Bleedings or vascular complications
- Local infections or fever

- Nausea and vomiting
- Skin necrosis / scars
- Tiredness / Unpleasantness
- Hair loss at the treated area
- Local tumors at the treated area as long-term side effect of radiation therapy
- Radiation ulcer
- Depigmentation

The risk of incorporation (entry of radioactive material in body) of the therapeutic beta-emitter exists only if products are used improperly.

1.2.5 Informed consent

Before undergoing a **Rhenium-SCT®** treatment, patients must be informed of the possible risks as part of an informed consent process. In addition to the information provided by the hospital as standard, they must, at the very least, be informed about the following:

- The fact that Rhenium-188 is an unsealed radioactive substance.
- The possible complications and side effects (see Chapter 1.2.4).

2 Safety

2.1 General safety information

- The rooms in which the treatment is administered must meet the requirements of providing treatment with unsealed nuclides and be equipped with the appropriate infrastructure for practising nuclear medicine or brachytherapy.
- The treatment room must be designated as a controlled area in line with the national radiation protection regulations. Neighbouring rooms must be monitored for exposure to radiation and, if necessary, also designated as controlled areas.
- National requirements governing the medical use of sealed radioactive substances as a form of treatment must be complied with. Radioactive material may only be handled by persons authorised to do so by the national radiation protection regulations.
- The operator must have gained approval from the competent authority to handle radioactive Rhenium-188.
- If possible, the treatment rooms should be chosen so as to prevent radioactive substances or components contaminated with radiation from having to be transported over long distances inside the treatment centre. Transporting these materials through public areas must be avoided whenever possible.
- Great care and attention are required when handling radioactive substances. Distractions must be avoided at all costs. It is recommended any foreseeable tasks to be trained in advance without radioactivity.

- All devices and instruments used must be handled with care. Careless handling may result in serious injury.

- Particular care must be taken when moving the base station over obstacles (e.g. door sills), as damage to the base station may occur here. If possible, such obstacles should be avoided.

- Suitable protective means of transportation that provide shielding against radiation (e.g. type A containers, shielded waste containers) must be used when moving radioactive substances, including inside the treatment centre.

- Radioactive material that is being handled should, as far as possible, always be shielded. Suitable shielding must therefore always be available for use during all tasks.

- Appropriate long-handled gripping tools (e.g. forceps) must be made available for handling the radioactive material.

- The time spent in close proximity to Rhenium-188 and components contaminated with Rhenium-188 must be minimised as far as possible. Maximum possible distance from Rhenium-188 shall be maintained at all times.

- A sufficiently shielded waste and transport container that is suitable for transporting waste in the treatment centre must be used to dispose of the contaminated disposable parts after use. The products required for this process can be purchased from **OncoBeta® GmbH**.

- The application system may only be installed and maintained by qualified personnel working for OncoBeta® GmbH, sister organizations of OncoBeta® GmbH or its certified sales partners.

- Due to its heavy weight (85 kg), the **OncoBeta® Application System** must be moved carefully to avoid injury.

- After use, rooms, devices and instruments must be checked for contamination.

2.2 Safety precautions during treatment

- Only products approved by **OncoBeta® GmbH** for this method of treatment may be used to treat patients (see also Chapter 3 “Description”).

- Inspections must be made before use to check that the application system and all other components employed are in full working order.

- Before each treatment, a zero-measurement needs to be performed with the dose calibrator to be used to rule out a contamination of the device.

- The foil in contact with the skin must be carefully fixed on the lesion and must be placed directly on top of it. Trapped air must be avoided at all costs.

- Since solids may get deposited at the bottom of the *carpoule*(s) during transportation and storage, the contents of the *carpoule*(s) must be mixed thoroughly before use with the help of the base station.

- When treating lesions that are greater than 25 cm², it may be necessary to use more than one *carpoule* on the lesion. In such an event, *carpoules* from the same lot must always be used and the *carpoules* must be swapped quickly. A second loaded applicator should be prepared in advance in such cases.

- The applicator may only be loaded with the help of the base station using the process outlined in Chapter 4.7. Carpoules must not be touched with the hands or placed in the applicator manually under any circumstances. The loaded applicator must be handled with care, as dropping it may result in the room becoming contaminated.

- The treatment may only be administered to patients who have been diagnosed by a specialist doctor with one of the indications specified in 1.2.1 above. Before administering the treatment, the area to be treated must be delineated and drawn out with a waterproof, dermatologically tested marker pen.

- The applicator may only be used if the location of the lesion to be treated allows for this. In certain circumstances when the lesion is located on inaccessible parts of the body, the Rhenium-SCT® procedure may not be possible.

- The medical professional must wear suitable personal protective equipment during the treatment process. As a minimum, this should comprise the following:
    - Lead glasses or a face mask that shield against radiation
    - Lead apron
    - Impermeable disposable gloves
    - Disposable apron

- To avoid contamination, the patient should be positioned in such a way that the lesion is in a horizontal position and can be easily accessed by the medical professional. Furthermore, the parts of the patient's body surrounding the lesion must be covered in a suitable fashion.

- It is advisable to place an additional suitable means of protection between the base station and the patient. In the event of contamination, this means of protection can easily be removed without significantly affecting the course of the treatment.

- Direct contact between the *compound* and the skin must be avoided at all costs. To this end, it is essential that the lesion to be treated is covered by the protective foil provided for this purpose (at least 2 cm of safety margin should extend outside of the borders of the lesion). The *compound* must only be applied directly to the foil once the foil has been placed on the skin; it must only be applied inside the boundaries of the area of the lesion that have been drawn on the skin (at least 5 mm of safety margin should extend outside of the borders of the lesion). The *compound* must not be applied directly to the area of the lesion to be treated under any circumstances, meaning the *compound* shall never be applied upon the skin directly. Before applying the *compound*, the medical professional must always check that the foil is intact, with no holes or tears in the fibre. The foil is only suitable to be used once and must not be reused.

- An even, thin layer of the *compound* must be carefully applied to the foil. The *compound* must be applied quickly and in a single operation.

- Particular care must be taken when applying the *compound* to areas near orifices and open wounds due to the heightened risk of incorporation.

- After the treatment time has been calculated, it must always be checked for plausibility. Irradiation time charts are provided by OncoBeta® GmbH, a sister company or its certified sales partners.

- The treatment time must be monitored using at least two separate devices (e.g. stopwatches) with alarms. At least one of the devices used to time the treatment must work independently of the mains power supply.

- During treatment, the patient's eyes must be protected from exposure to radiation, e.g. using appropriate goggles. This applies in particular when the skin on the face is being treated.

- The patient must be protected from unnecessary exposure to radiation at all times. This can be ensured by following the best possible procedures, positioning the patient appropriately in the room and, if necessary, using suitable shielding (e.g. lead rubber mats).

- During the irradiation process, medical professionals and third parties must not remain in the treatment room unnecessarily. If an individual needs to be present during the irradiation process, suitable shielding equipment must be made available and the individual must remain as far away from the patient as possible. Bystanders must not enter or remain in the treatment room during any part of the treatment process.

- To avoid the foil becoming damaged, care must be taken when being removed.

- When removing the *compound* together with the foil from the lesion, long-handled gripping devices must always be used.

- When removing the foil together with the (hardened) *compound* after treatment, the medical professional must ensure that the treatment room is not contaminated.

- After treatment, the patient, personnel administering the treatment and the radiotherapy room, including the instruments and devices used, must be tested for contamination.

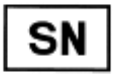
- In the event of contamination and/or incorporation, the appropriate contingency plan must be followed (see Chapters 4.13 and 4.14).

- All contaminated materials (disposable items: foils, *carpoule*, *compound*) must quickly be disposed of into the waste container using tongs.

- Contaminated instruments must be packed away in a liquid-tight manner and shielded appropriately by using lead bricks, for example.

- The applicator as well as any system components that could possibly come into contact with the patient during the treatment process must be disinfected after use (see also Chapter 4.15 on how to clean the **OncoBeta® Application System**). This does not apply to the disposable parts used.

2.3 Symbols used

Device reference number		Keep in a dry place	
Lot number		Keep away from sunlight	
Serial number		Quantity	
Manufacturer		Temperature limits	
Handle with care		Observe the instructions for use	
Date of manufacture		Warning	
Expiry date		CE mark	
Radioactive			
Ethylene oxide sterilisation			

3 Description

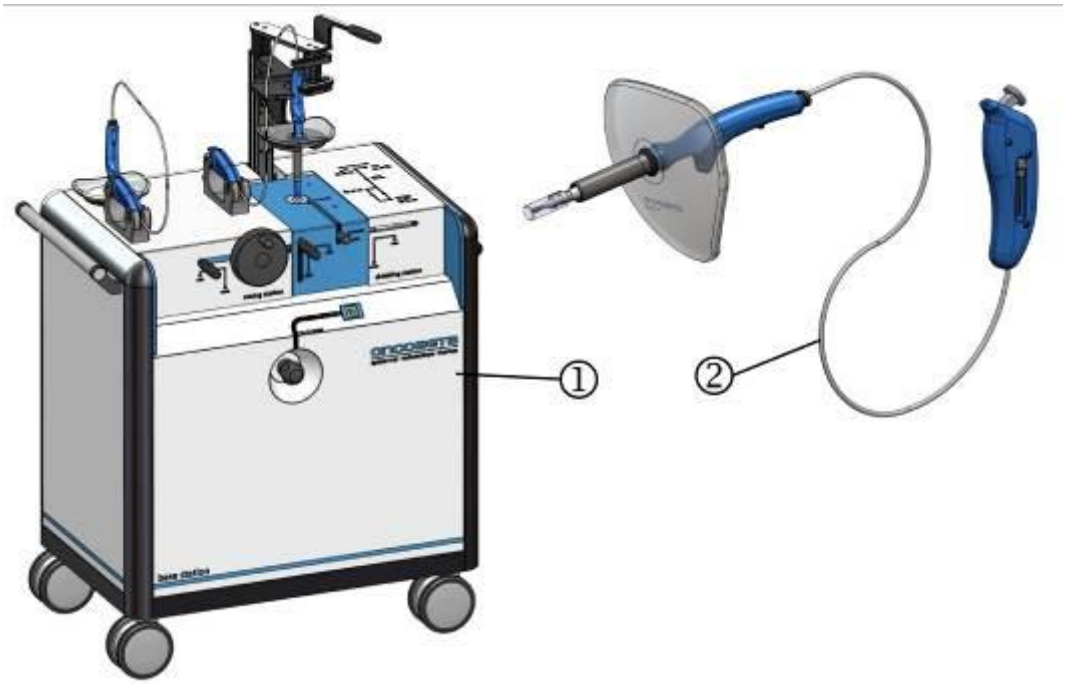
3.1 OncoBeta® Application System

The **OncoBeta® Application System** (Figure 1) comprises the following components:

- **Base station**
- **Applicator**

The **OncoBeta® Application System** is used to safely handle and apply the *compound*.

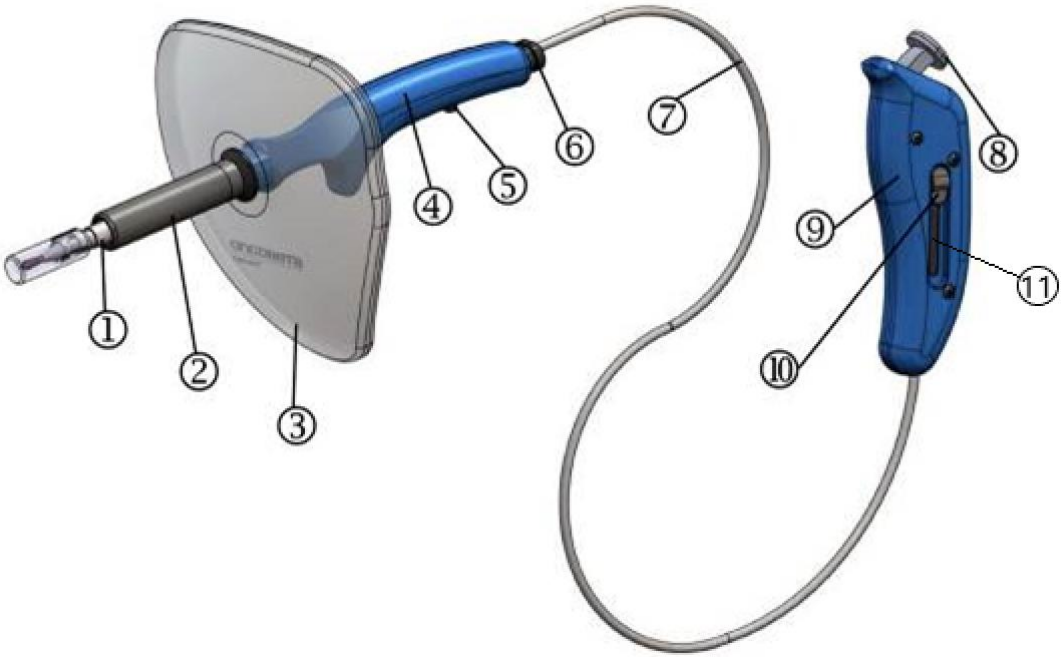
Figure 1 OncoBeta® Application System



1 ***Base station:*** Used to safely load the *carpoules* into the *applicator*.

2 ***Applicator:*** Used to apply the *compound* to the lesion.

Figure 2 Applicator



1 ***Carpoule:*** Contains the *compound*.

2 ***Carpoule holder:*** Holds the *carpoule* and shields against the radiation emitted.

3 ***Hand screen:*** Acrylic glass screen used to shield the hand from beta radiation.

4 ***Handle:*** Holds and guides the *applicator*.

5 ***Ejection safeguard:*** Prevents accidental ejection of the *carpoule*. The *ejection safeguard* must be pressed and held down before pressing the *eject button* (6).

6 ***Eject button:*** Used to eject the *carpoule*.

7 ***Connecting cable:*** Connects the *actuator* to the applicator handle.

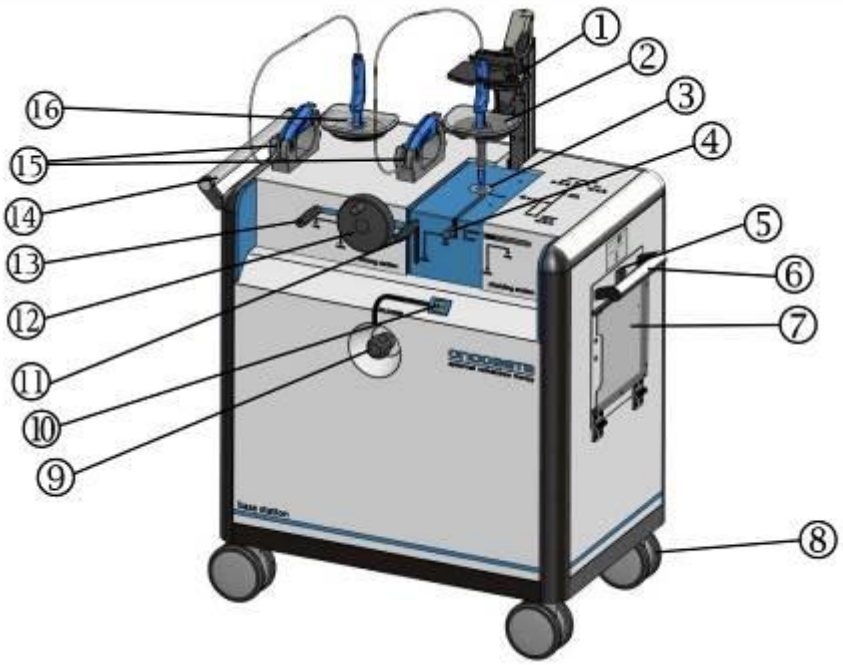
8 ***Dispense button:*** Pressing the dispense button applies compound to the brush.

9 ***Actuator:*** Dispenses the compound via the dispense button. The pressing of the dispense button is relayed to the carpoule via a wire inside the connecting cable.

10 ***Reset slider:*** Make sure the applicator is reset before the next carpoule is loaded.

11 **Color indication:** Indicates green color when the slider is reset, indicates red color when the carpoule is empty.

Figure 3 Base station



1 ***Guide handle:*** Operates the *applicator holder* and is used to move the *applicator* up and down in the *base station*.

2 ***Applicator holder*****:** The *applicator* is placed in the *applicator holder* to be loaded.

3 ***CAP HOLDER*****:** Holds the *protective cap* of the *carpoule*.

4 ***CAP HOLDER* lever:** When the lever is pressed down (*LOCK* position), the *protective cap* of the *carpoule* is locked in the *CAP HOLDER.* When the lever is pushed up (*UNLOCK* position), the lock is released.

5 ***Loading flap* locking button:** Pressing down the locking button releases the lock on the *loading flap*, allowing the *loading flap* to be opened.

6 ***Loading flap:*** Used when loading the *transport unit* into the *base station*. The *loading flap* can only be opened when *carpoule* position 1 is selected. To open the *loading flap*, the locking button must be pressed down.

7 ***Document holder:*** Holds the documents that accompany the **OncoBeta® Rhenium-188-Compound** as well as the “Radioactive” warning sign, which must be displayed when the station is loaded with *carpoules*.

Figure 3 continued

8 ***Wheels*** (x 4): All four wheels are fitted with brakes which are applied by pressing down the lever. The wheels on the right-hand side of the base station can be locked in a parallel position by pushing up the lever. This allows the base station to be transported easily and safely.

9 ***Push and pull knob:*** The *carpoule* to be loaded can be selected by operating the *push and pull knob* (by pulling it fully out and pushing it back in again). Carpoule position 5 is followed by *carpoule* position 1. The *loading flap* can only be opened in *carpoule* position 1.

10 ***CARPOULE NO.*** **display:** Displays the number of the *carpoule* that is currently selected. The next *carpoule* can be selected by operating the *push and pull knob*.

11 **Handle for moving the *SHIELDING STATION:*** Moves the *SHIELDING STATION* between the *WORK* and *PARK* positions. Pressing down the handle locks the *SHIELDING STATION* in the selected position.

12 ***MIXING STATION*** **hand wheel:** Turning the hand wheel mixes the *compound* in the selected *carpoule*.

13 **Handle for moving the *MIXING STATION*:** Moves the *MIXING STATION* between the *WORK* and *PARK* positions. Pressing down the handle locks the *MIXING STATION* in the selected position.

14 **Handle:** Used to move the *base station*.

15 ***Actuator holder*** (x 2): The *actuator* can be placed in the *actuator holder*. Inserting the *actuator* into the *actuator holder* allows it to be held in place.

16 ***Shielded holder:*** A second *applicator* can be placed in the *shielded holder*. Since this holder is shielded, an *applicator* that has already been loaded with a *carpoule* may be placed here as well.

3.2 Additional products required

The following products are also needed to perform a **Rhenium-SCT®** procedure:

- **OncoBeta® Rhenium-188-Compound**
- **OncoBeta® Measurement Station**
- **Sterile Protective Foil**
- A waste container for radioactive substances (e.g. the **OncoBeta® Waste Station**)

The above products can be purchased from OncoBeta® GmbH, its sister organizations or certified sales partners.

PLEASE NOTE

The instructions for using the above products must also be observed.

3.2.1 OncoBeta® Rhenium-188-Compound

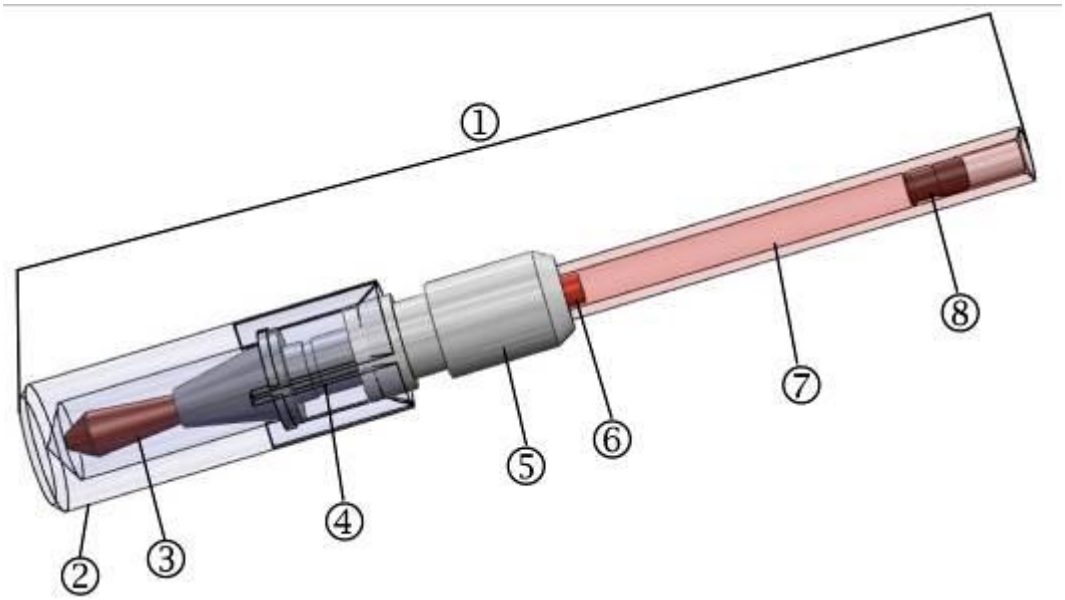
The **OncoBeta® Rhenium-188-Compound** is a rhenium-188 sulphide in a viscous polymeric matrix. For ease of handling and to prevent contamination, the *compound* is delivered in a *carpoule*. The **OncoBeta® Application System** is used to help apply the **OncoBeta® Rhenium-188-Compound** to the protective foil that covers the lesion to be treated.

The *carpoule* and *compound* must be used only once.

WARNING

The OncoBeta® Rhenium-188-Compound is a radioactive substance. It must be handled safely at all times.

Figure 4 OncoBeta® Rhenium-188-Compound



1 ***Carpoule:*** Complete unit comprising parts 2–8.

2 ***Protective cap*****:** Protects against contamination.

3 ***Brush:*** Applies the *compound* to the *foil*.

4 ***Activation mechanism:*** Pressure on the *activation mechanism* activates the *carpoule*. This means that *compound* leaves the *reservoir* and is loaded onto the *brush*.

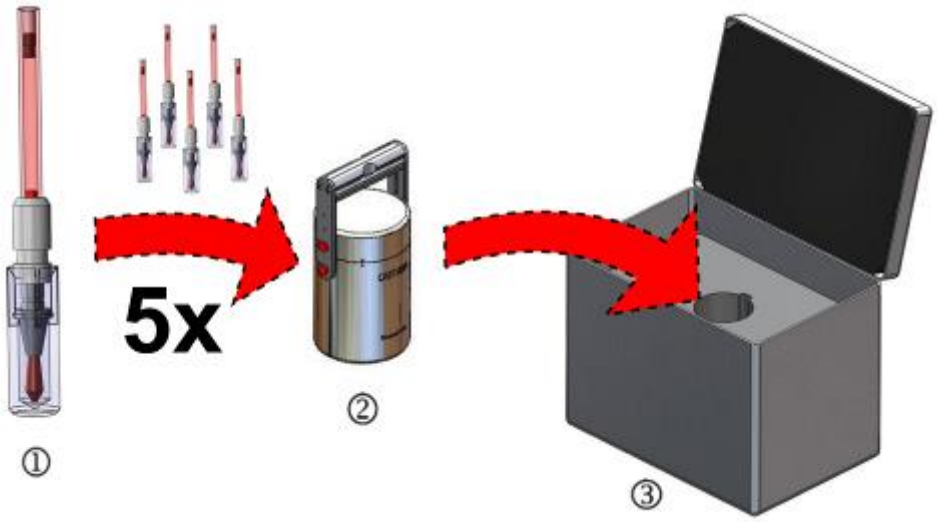
5 ***Connector*****:** The *connector* ensures that the *carpoule* is held securely in the *applicator*.

6 ***Mixing element*****:** The *mixing element* is moved up and down inside the *reservoir* by a magnetic field in the *MIXING STATION* in order to homogenise the *compound* before use.

7 ***Reservoir* with *compound*****:** The *reservoir* contains the *compound*. The *compound* is a viscous liquid comprising radioactive rhenium sulphide in a film-forming agent.

8 ***Piston:*** The *piston* conveys the *compound* from the *reservoir* to the *brush*.

Figure 5 OncoBeta® Rhenium-188-Compound



1 ***Carpoule*****:** see Figure 4

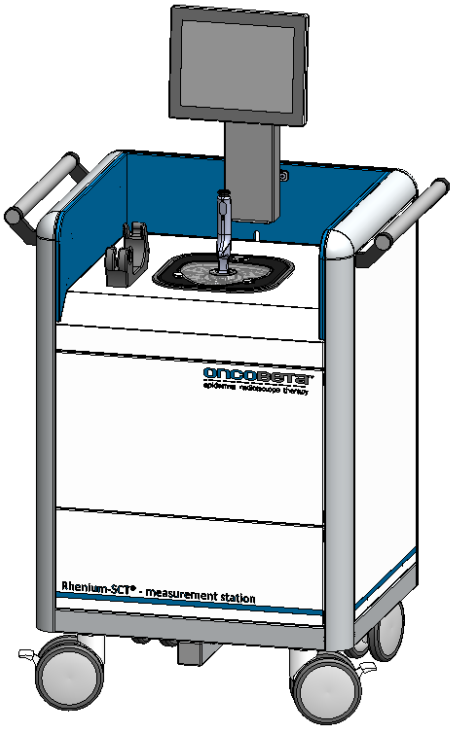
2 ***Transport unit:*** Used to safely transport up to five *carpoules* of the **OncoBeta® Rhenium-188-Compound**.

3 ***Logistics unit:*** When used together, the *transport unit* and *logistics unit* form a Type A package suitable for transporting hazardous materials.

3.2.2 OncoBeta® Measurement Station

The **OncoBeta® Measurement Station** is used to determine the activity of the radioactive substance being applied. The **OncoBeta® Measurement Station** consists of a portable activity meter, so called dose calibrator, which is fitted into a trolley. For detailed specification please see the System User Manual for the Measurement Station.

Figure 6 OncoBeta® Measurement Station



3.2.3 Sterile Protective Foil

The protective foil has been tested by OncoBeta GmbH and is found suitable for the application and within the scope of the treatment. Below are some of the properties of this foil:

- Sterile
- Waterproof
- Transparent
- Auto-adhesive
- Latex free
- Hypoallergenic

Manufacturer	Article description	Article code
AERO Healthcare ltd.	AeroFilm™ 15 x 20 cm	AFW015

Its size is 15 x 20 cm and may be cut with sterile scissors to fit optimally the region to be treated including a security margin of at least 2 cm if possible. If the region to be treated has a larger area, several foils may be used.

3.2.4 OncoBeta® Waste Station

The **OncoBeta® Waste Station** comprises a shielded trolley and a removable waste container. The waste container is used to dispose of materials contaminated with radiation. Another suitable waste container may alternatively be used.

Figure 7 OncoBeta® Waste Station

4 Treatment

Overview of the treatment plan

The treatment plan is illustrated in the following flow chart:

Chapter	Activity
4.1	Diagnosis and setting the treatment parameters
4.2	Ordering the OncoBeta® Rhenium-188-Compound
4.3	Delivery and accepting the delivery
4.4	Loading the base station
4.5	Preparing the patient
4.6	Loading the applicator
4.7	Applying the *compound*
4.8	Calculating the irradiation time
4.9	Removing the *compound*
4.10	Treating the patient after the procedure
4.11	Emptying the base station
4.12	Dealing with contamination
4.13	Procedure to follow in the event of incorporation
4.14	Cleaning the OncoBeta® Application System

4.1 Diagnosis and setting the treatment parameters

Diagnosis must be made before administering the treatment. In order for the method of treatment to be applied, one of the indications specified in 1.2.1 must be diagnosed.

The following data must be collected:

- Type of lesion
- Surface area of the lesion
- Depth of the lesion

The following treatment parameters must be set:

- The area to be treated
- The tissue depth to be reached
- The dose to be administered at the desired tissue depth

4.2 Ordering the OncoBeta® Rhenium-188-Compound

The **OncoBeta® Rhenium-188-Compound** is produced by OncoBeta® GmbH. The *compound* must be ordered following the lead times indicated by OncoBeta® GmbH, sister companies or its certified sales partners to the customer. The order must be placed using the order forms provided by OncoBeta® GmbH.

When ordering the **OncoBeta® Rhenium-188-Compound**, a treatment plan and corresponding requirements plan must be submitted. This should include the treatment date, the number of patients expected to be treated and an estimation of the surface areas of the tumours to be treated. OncoBeta® provides an order form including this information.

A valid permit for handling the required quantity of rhenium-188 must also be submitted when placing the order.

4.3 Delivery and accepting the delivery

The **OncoBeta® Rhenium-188-Compound** is delivered to the client at the agreed delivery time. Owing to radiation protection regulations, the delivery of the **OncoBeta® Rhenium-188-Compound** may only be accepted by an authorised person.

PLEASE NOTE

The client must check the **OncoBeta® Rhenium-188-Compound** shipping documents before using the product.

4.4 Loading the base station

The base station must be loaded with the transport unit before treatment commences. The rhenium-188 *carpoules* are located in the transport unit as described. To load the base station, please follow the steps below:

WARNING

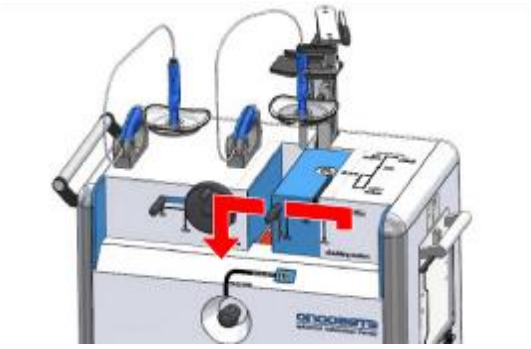
The following steps for loading the base station must be carried out in the order specified below.

1

Move the *SHIELDING STATION* into the *WORK* position. This ensures that a sufficient level of protection against radiation is provided.

Lift the *handle for moving the SHIELDING STATION*. Push it to the left until it stops.

Lock the *SHIELDING STATION* by pressing down the *handle for moving the SHIELDING STATION.*



2

Position the *logistics unit* to the right of the *base station*.

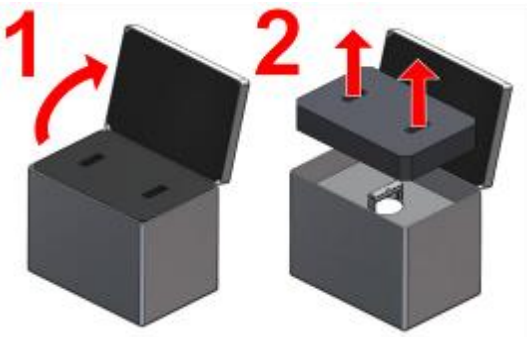
3

Open the four locks on the *logistics unit*.

To do so, push the safety catch (1) downwards and undo the locks (2).

Open the *logistics unit* (1).

Remove the top block of foam from the *logistics unit* (2).

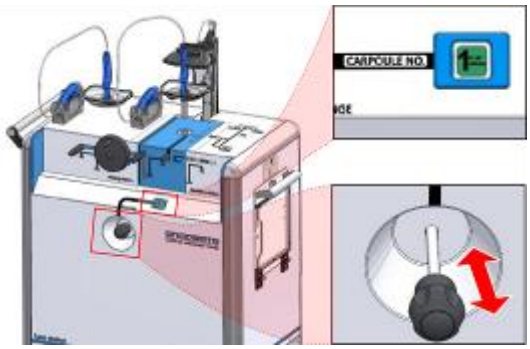


4

Make sure that the *CARPOULE NO.* display on the base station shows the number "**1**". Otherwise, it will not be possible to open the *loading flap* on the *base station*.

To change the *carpoule* number, pull the *push and pull knob* fully out and push it back in again.

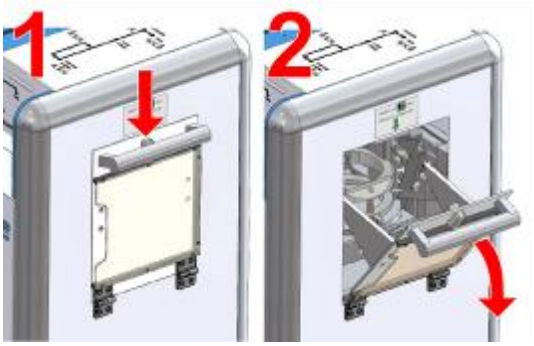
Repeat this process until the *CARPOULE NO.* display shows the number "**1**" ("Flap Opens").



5

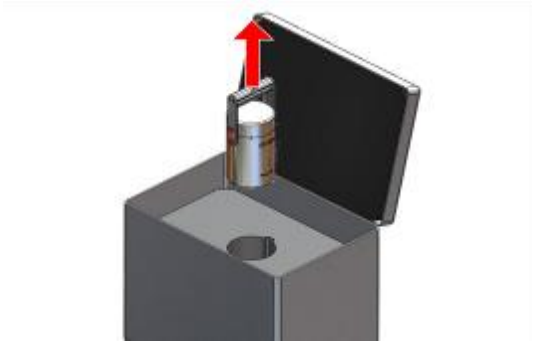
Open the *loading flap* on the right-hand side of the *base station*. To do so, push the black *locking button* downwards (1).

Then pull the handle on the *loading flap* (2). This automatically releases the holder for the *transport unit* through the *loading flap*.



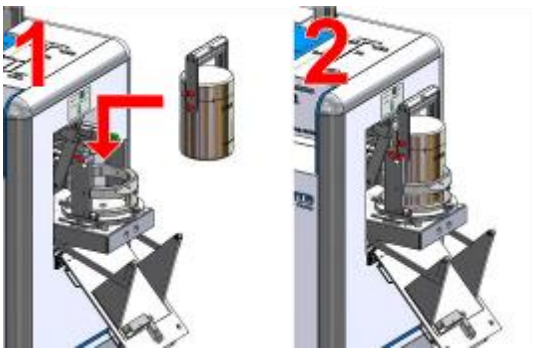
6

Next, remove the *transport unit* from the *logistics unit*.



Place the *transport unit* in the holder on the *base station*.

When doing so, make sure that the *transport unit* is positioned correctly in accordance with the red and green coloured markings and the label “OUTSIDE”.

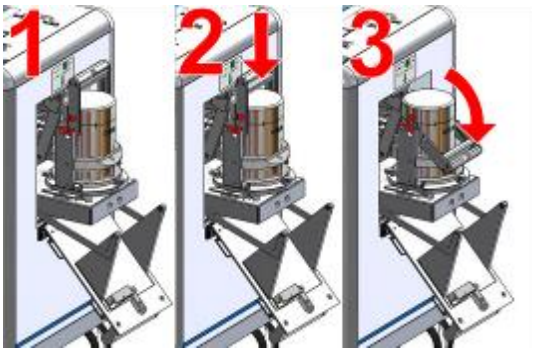


7

Release the lock on the handle of the *transport unit*.

To do so, push the lower segment on the handle downwards until it stops (2).

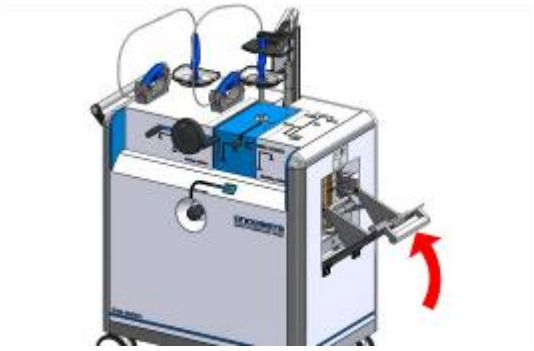
Fold down the handle of the *transport unit* outwards (3).



8

Close the *loading flap* on the *base station*. Make sure that the *loading flap* is locked in place.

The loading process is now complete.



PLEASE NOTE

An appropriate sign must be placed on the *base station* when it is loaded. To this end, a “Radioactive” warning sign (included in the delivery contents) can be placed in the *document holder*.

4.5 Preparing the patient

PLEASE NOTE

Medical practices are the responsibility of the specialist hospital personnel providing the treatment. The following clinical procedures have been observed in everyday clinical practice; however they do not constitute mandatory requirements set by OncoBeta® GmbH. The specialist hospital personnel have a duty to keep up to date with the latest medical findings and to choose the most appropriate procedures for their patients.

Before treatment, the lesion must be cleaned and any crusting must be removed in an appropriate manner. If necessary, a sedative or pain relief should be administered.

The area to be treated must be identified and drawn out using a dermatologically tested marker pen.

The foil must then be applied to the lesion to be treated. Special care should be taken that crusts and scabs are removed and any bleeding is stopped. In case of lesions treated after surgery or curettage, the latest is of particular importance. To fix the foil, it is important that no air pockets or folds form in the wound foil and that the wound foil is in direct contact with the skin in the area of the lesion to be treated. To avoid healthy skin from becoming contaminated, the foil should cover the skin a few centimetres (>2 cm if possible) beyond the area to be treated using the Rhenium-SCT.

The patient should be positioned in such a way that the lesion to be treated is in a horizontal position and can be easily accessed. It must be ensured that the patient can comfortably remain in this position for the duration of the treatment.

The area of the patient's body surrounding the lesion must be covered to ensure that any contamination that may occur can be easily removed.

The patient must be protected from avoidable exposure to radiation, provided that the position of the lesion allows for this. Lead rubber mats can, for example, be used to provide protection. The eyes must be protected from exposure to radiation, especially when the treatment is being administered to the head and surrounding areas.

4.6 Loading the applicator

The applicator must be loaded with a *carpoule* before each treatment. To complete this operation, please follow the steps below:

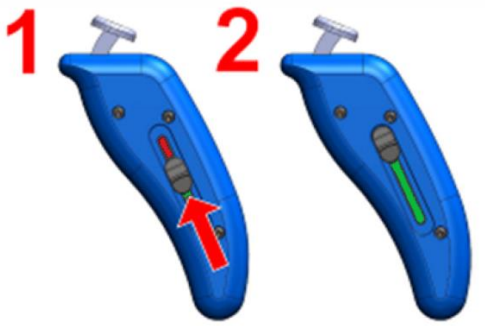
WARNING

The following steps for loading the applicator must be carried out in the order specified below.

1

Completely reset the *reset slider* on the *applicator actuator.*

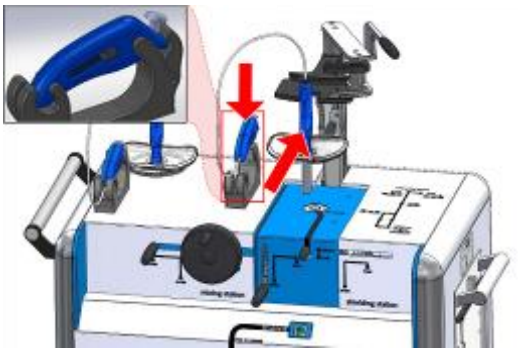
To do so, push the *reset slider* in the direction of the arrow until it stops (1). Image 2 shows the correct position.



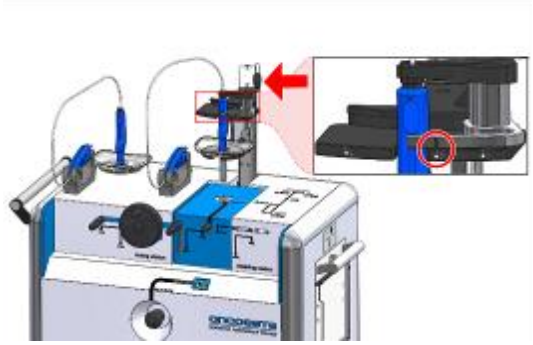
2

Place the *applicator* in the *applicator holder*. The projecting part on the handle should be pointing towards you.

Place the *actuator* in the *actuator holder* provided, making sure that it is positioned as shown in the adjacent image.



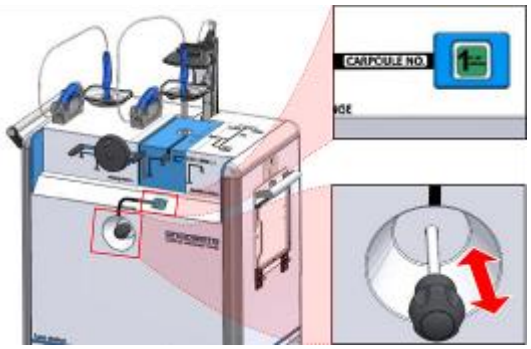
Lock the *applicator* in place by moving the *guide handle* to the left to position 2.



3 Select the *carpoule* to be loaded.

Pull the *push and pull knob* fully out and push it back in again.

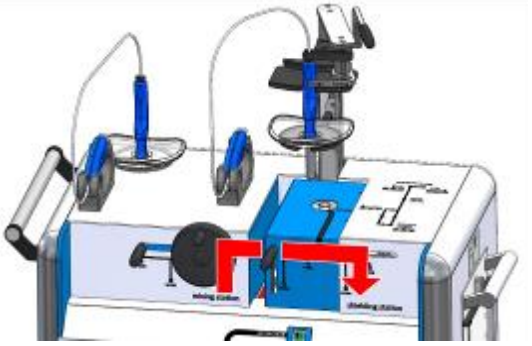
Repeat this process until the *CARPOULE NO.* display shows the desired position.



4 Move the *SHIELDING STATION* to the *PARK* position.

To do so, lift the *handle for moving the SHIELDING STATION.* Push it to the right until it stops.

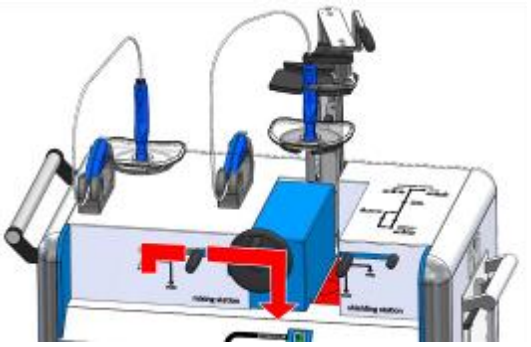
Lock the *SHIELDING STATION* in the *PARK* position by pressing down the *handle for moving the SHIELDING STATION.*



5 Move the *MIXING STATION* to the *WORK* position.

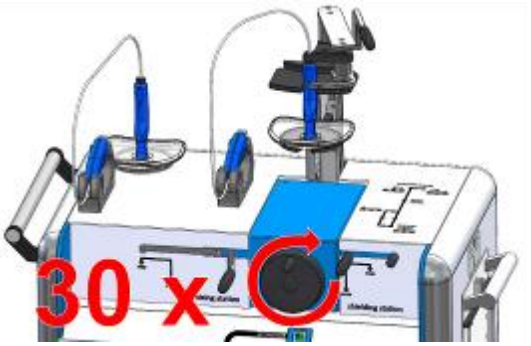
To do so, lift up the *handle for moving the MIXING STATION* and push it towards the right until it stops.

Lock the *MIXING STATION* in the *WORK* position by pressing down the *handle for moving the MIXING STATION.*



6 Homogenise the *compound*.

To do so, turn the *hand wheel on the MIXING STATION* at least 30 times (in a clockwise direction).

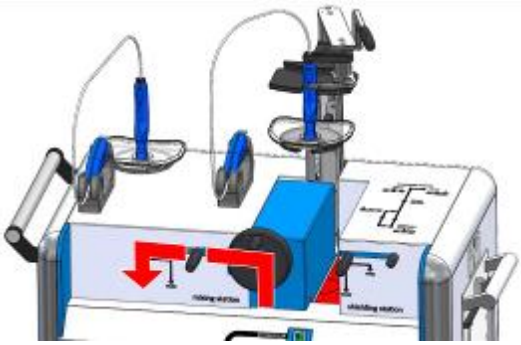


7

Move the *MIXING STATION* to the *PARK* position.

To do so, lift up the *handle for moving the MIXING STATION*. Push it to the left until it stops.

Lock the *MIXING STATION* in the *PARK* position by pressing down the *handle for moving the MIXING STATION.*



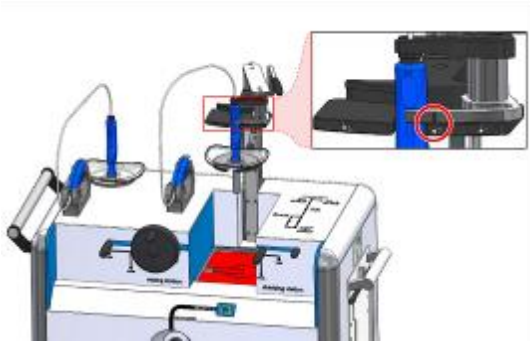
PLEASE NOTE

The *MIXING STATION* can only be moved when the handle on the *MIXING STATION hand wheel* is in the upper position (12 o' clock).

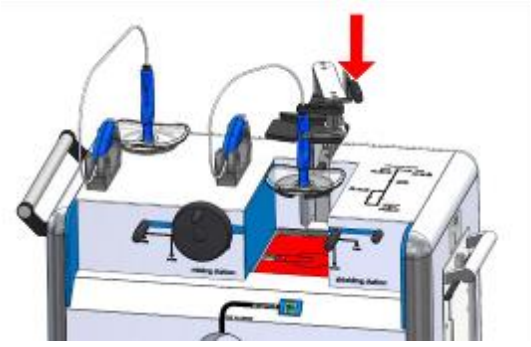
8

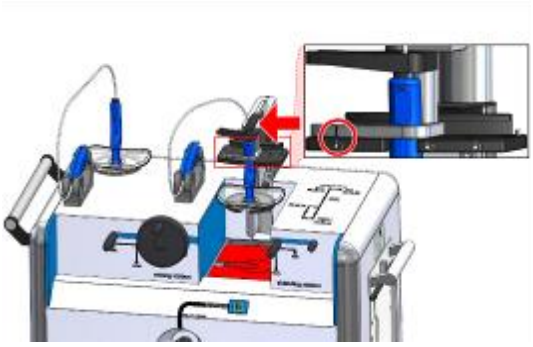
Load the *applicator*.

Lock the *applicator* in place by moving the *guide handle* to position 2.

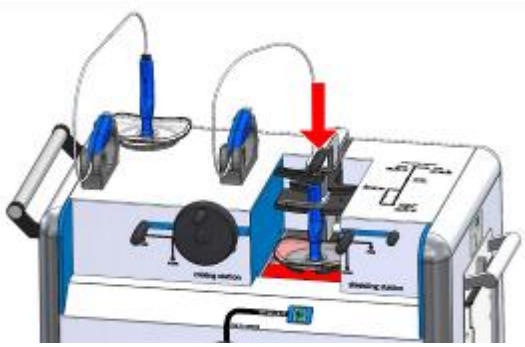


Lower the *applicator* into the intermediate position by pressing down the *guide handle* until it stops.





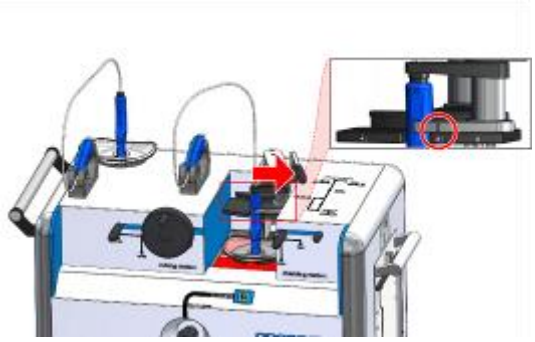
Move the *guide handle* into position 3 by pushing the *guide handle* to the left until it stops.



Push the *guide handle* downwards until it stops to insert the *applicator* into the *base station*.

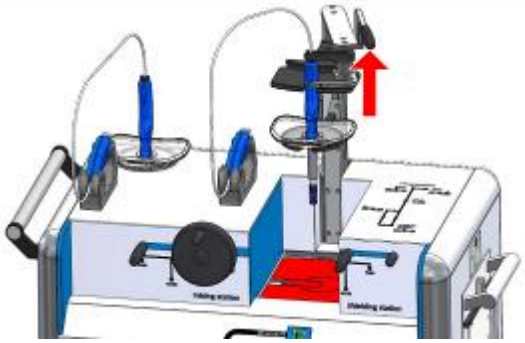
9

Move the *guide handle* into position 2 by pushing the *guide handle* to the right until it stops.



Pull the *applicator* from the *base station* by raising the *guide handle* until it stops.

The *applicator* is now loaded with a *carpoule*.

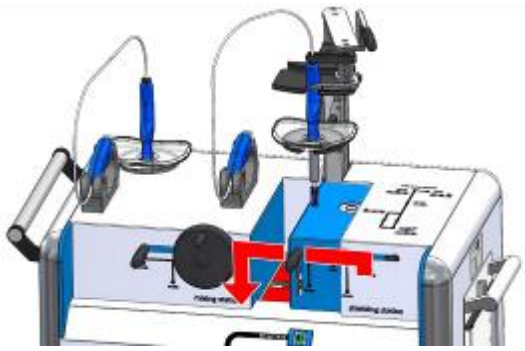


10

Move the *SHIELDING STATION* into the *WORK* position.

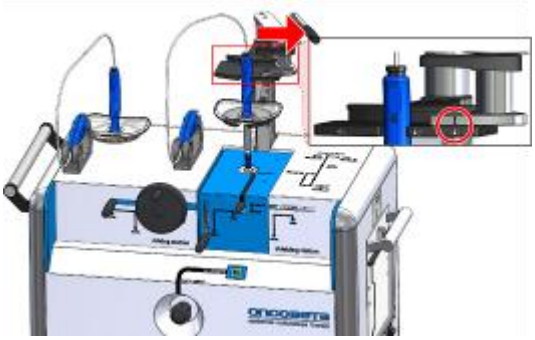
To do so, lift the *handle for moving the SHIELDING STATION.* Push it to the left until it stops.

Lock the *SHIELDING STATION* by pressing down the *handle for moving the SHIELDING STATION.*



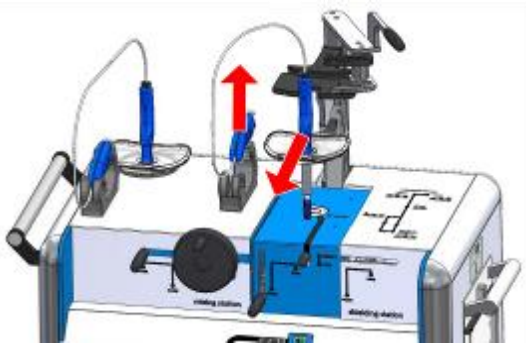
11

Open the lock on the *applicator*. Move the *guide handle* into position 1 by pushing the *guide handle* to the right until it stops.



Remove the *applicator* from the *applicator holder*.

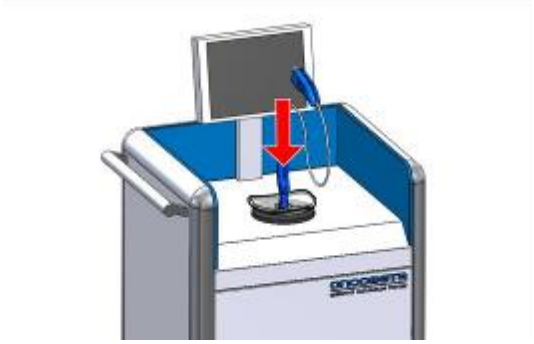
Remove the *actuator* from the *holder* at the same time.



12

Insert the *applicator* into the activity meter on the *OncoBeta® Measurement Station*.

Take the first reading.



PLEASE NOTE

When taking the reading from the *OncoBeta® Measurement Station*, follow the instructions in the user manual for the activity meter used.

13

After the reading has been taken, the *applicator* can be used to apply the *compound* (see Chapter 4.7).

If, alternatively, the loaded *applicator* is not needed until later, it must be stored in the *shielded holder*.

In addition to the *shielded holder*, a second *actuator holder* is also available.

4.7 Applying the *compound*

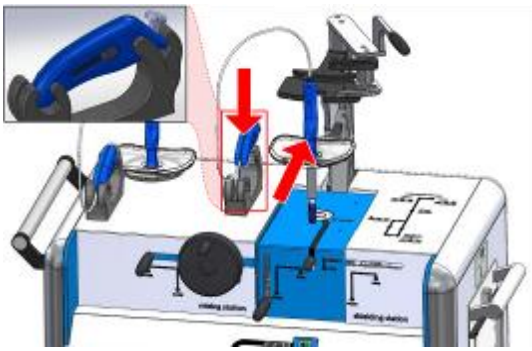
WARNING

The following steps for applying the *compound* must be carried out in the order specified below.

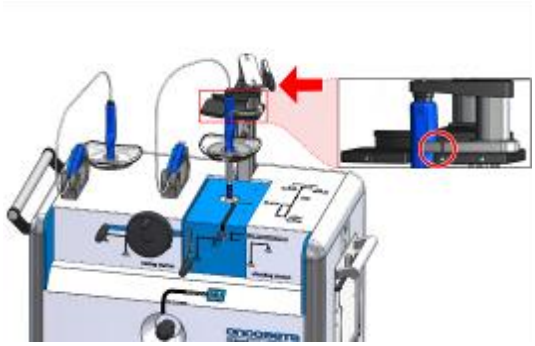
1

Place the *applicator* in the *applicator holder*. The projecting part on the handle should be pointing towards you.

Place the *actuator* in the *actuator holder* provided, making sure that it is positioned as shown in the adjacent image.

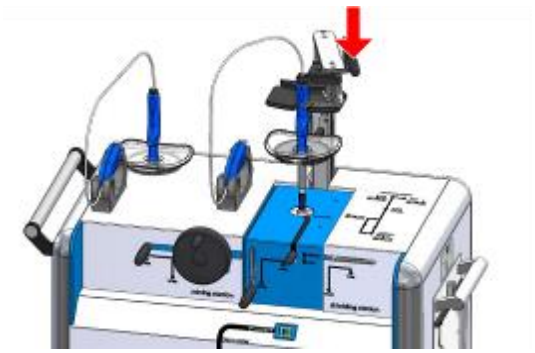


Lock the *applicator* in place by moving the *guide handle* to the left to position 2.



2

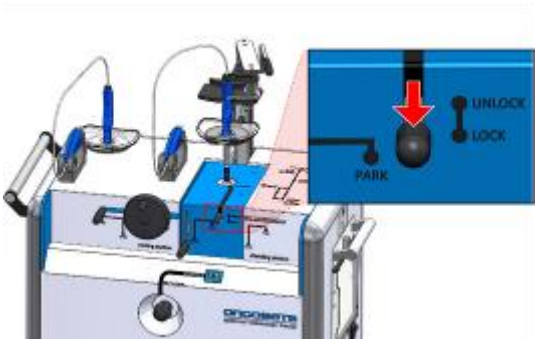
Push the *guide handle* downwards until it stops. This inserts the tip of the *applicator* into the *CAP HOLDER*.



3

Secure the *protective cap* of the *carpoule.*

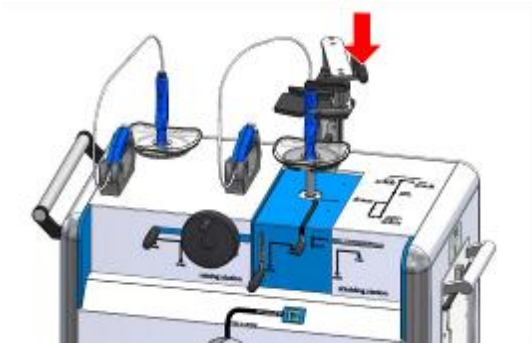
To do so, push the *CAP HOLDER lever* downwards into the *LOCK* position.



4

Activate the *carpoule* by pushing the *guide handle* downwards with some force until it stops.

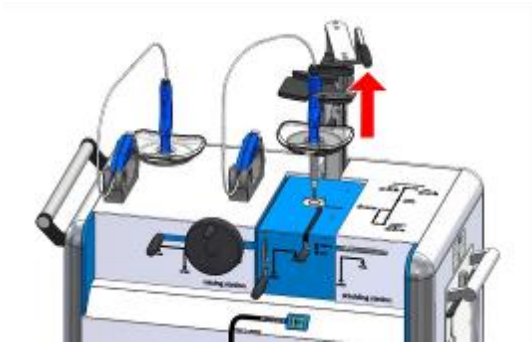
The activation of the *carpoule* can be detected by a clicking noise.



5

Lift the *guide handle* until it stops.

When doing so, the *protective cap* of the *carpoule* remains in the *CAP HOLDER*.



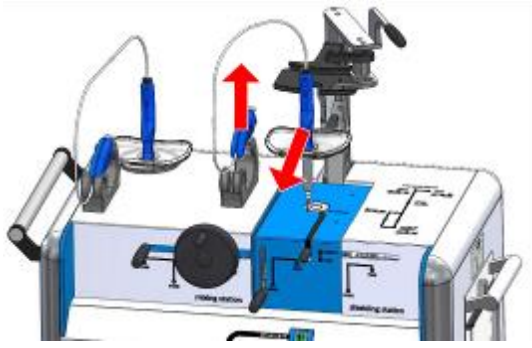
6

Open the lock on the *applicator*. Move the *guide handle* into position 1 by pushing the *guide handle* to the right until it stops.

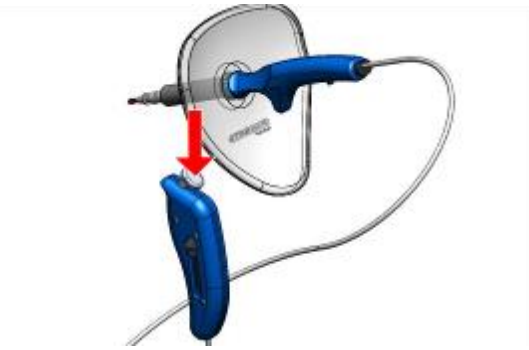
Remove the *applicator* from the *applicator holder*.

Remove the *actuator* from the *holder* at the same time.

Move the *applicator* so that it is close to the patient.



7 Carefully press the *dispense button* on the *actuator* until the *brush* is moistened with the *compound*.



PLEASE NOTE

It is essential that the *compound* is dispensed evenly and carefully. To keep exposure to radiation to a minimum, this process must also be carried out as quickly as possible.

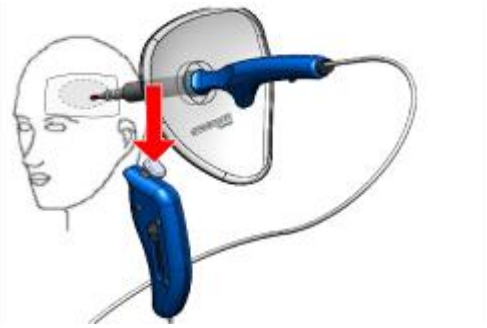
8 Spread the *compound* evenly on the foil that has been applied to the skin.

Make sure that you do not go outside the area that has been marked out.

To obtain additional *compound* on the *brush*, press the *dispense button* on the *actuator* again.

Dispense the *compound* slowly and evenly.

The process is complete once the lesion that has been marked out is completely covered by the *compound*.



PLEASE NOTE

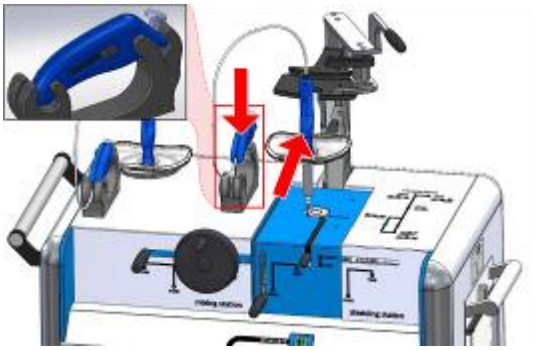
The contents of one *carpoule* are sufficient for a lesion with a surface area of around 25 cm². If necessary, the contents of multiple *carpoules* can be used to treat a lesion. In such cases, only *carpoules* from the same lot may be used (refer to the LOT number in the shipping documents).

9

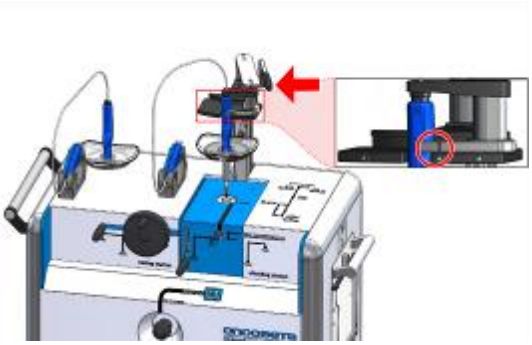
The *carpoule* must be sealed immediately.

Return the *applicator* to its holder. The projecting part on the handle should be pointing towards you.

Place the *actuator* in the *actuator holder* provided, making sure that it is positioned as shown in the adjacent image.

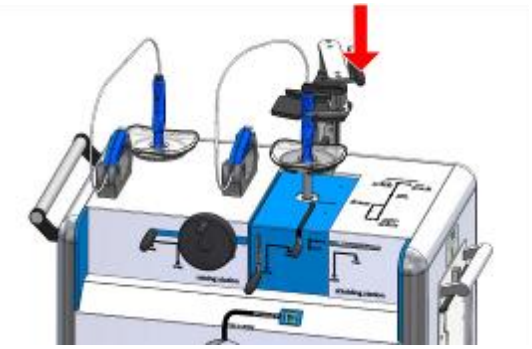


Lock the *applicator* in place by moving the *guide handle* to the left to position 2.



10

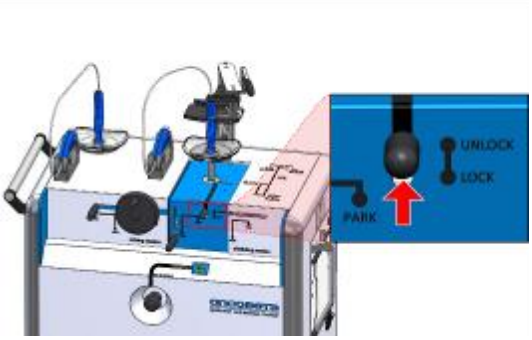
Push the *guide handle* downwards until it stops. This inserts the tip of the *applicator* into the *CAP HOLDER*.



11

Unlock the *protective cap* of the *carpoule.*

To do so, push the *CAP HOLDER lever* upwards into the *UNLOCK* position.



12

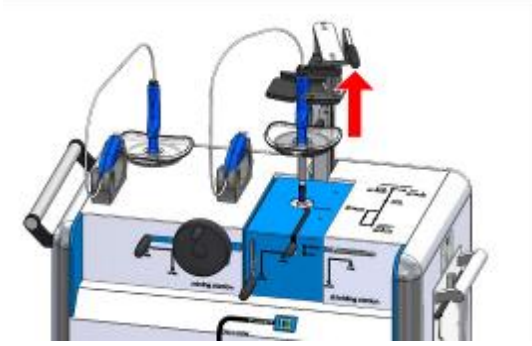
The irradiation time starts now.

PLEASE NOTE

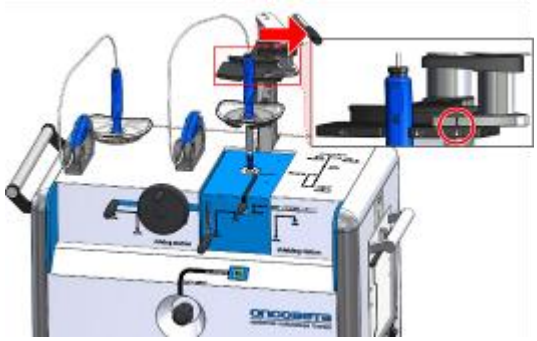
The time taken to perform steps 10 to 13 must be taken into account when calculating the irradiation time.

13 Lift the *guide handle* until it stops.

This removes the *applicator* from the *CAP HOLDER*.

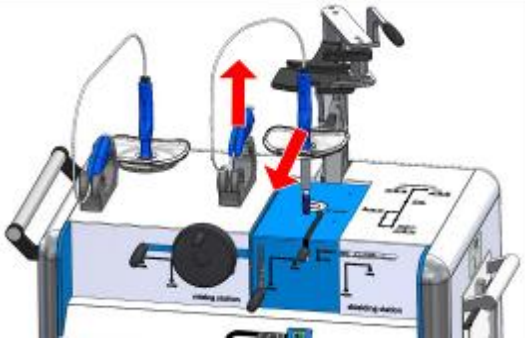


14 Open the lock on the *applicator*. Move the *guide handle* into position 1 by pushing the *guide handle* to the right until it stops.



Remove the *applicator* from the *applicator holder*.

Remove the *actuator* from the *holder* at the same time.



15 Insert the *applicator* into the activity meter on the *OncoBeta® Measurement Station*.

Take the second reading.

The remaining activity in the carpoule could be then used to treat either additional lesions on the same patient, or different patients. After the second measurement (point 15), process 4.7

(applying the compound) should be then followed for the second treatment with the remaining activity in the carpoule and to remove the protective cap from the carpoule (Step1 of 4.7).

The process 4.6 (from section 3) could be repeated for the use of multiple carpoules in treating additional lesions, on the same patients or on different patients, depending on the number or size of the lesions to be treated.

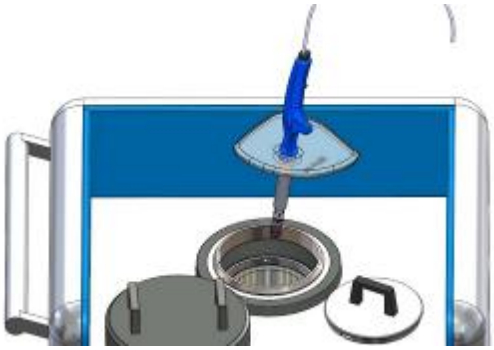
PLEASE NOTE

When taking the reading from the *OncoBeta® Measurement Station*, follow the instructions in the user manual for the dose calibrator used.

16 Lift the lid of the lead shield from the **OncoBeta® Waste Station** as shown (1) and remove the lid from the waste container by turning it anti-clockwise and lifting it upwards (2).

17 After completing the measurement process, remove the *applicator* from the measurement station.

Position the *applicator* over the open waste container.

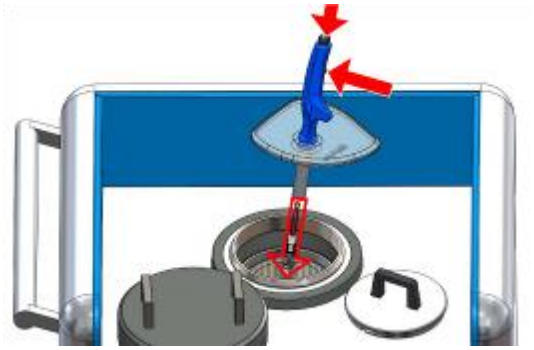


18

First, press the *ejection safeguard* on the side of the *applicator* until it stops and then press the *eject button* on the top of the *applicator* until it stops. This causes the *carpoule* to be ejected from the *carpoule holder* on the *applicator*.

The *carpoule* is disposed of in the waste container.

Close the waste container and place the lid on the lead shield.



PLEASE NOTE

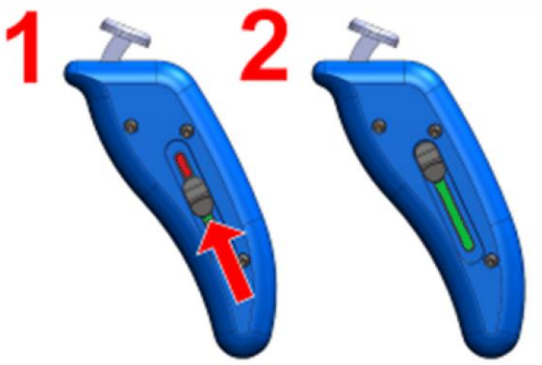
If the *carpoule* is not ejected from the *applicator*, proceed as follows: Keep the *eject button* and the *ejection safeguard* pressed down. The *carpoule* can then be knocked off against the inside edge of the waste container. Alternatively, long forceps or pliers can be used to pull the *carpoule* out from its position in the applicator.

The *carpoule* must not be touched by the hands under any circumstances, as doing so would expose the skin to radiation. Additionally, never look directly at the front of the loaded *applicator*.

19

Completely reset the *reset slider* on the *applicator actuator.*

To do so, push the *reset slider* in the direction of the arrow until it stops (1). Image 2 shows the correct position.



20 Check the *applicator* for contamination.

PLEASE NOTE

When measuring for contamination, make sure there are no additional radioactive substances in the area being tested by the meter. This keeps background radiation to a minimum.

21 Completely remove any sources of contamination found.

Alert others of any remaining contamination.

Further information on how to deal with contaminated materials and on decontamination is available in Chapters 4.12 and 4.14.

PLEASE NOTE

During the irradiation time, personnel must not remain in the radiotherapy room. If this cannot be avoided, suitable shielding must be provided. Appropriate signage must be put in place outside the radiotherapy room for the duration of the irradiation period.

4.8 Calculating the irradiation time

The irradiation time required must be calculated by a qualified member of staff with specialist knowledge in this area. The information required for this calculation and the irradiation time charts for checking the plausibility of the treatment time (including a dedicated instruction for use) are provided by OncoBeta® GmbH, a sister company or its certified sales partners.

The recommended target radiation dose to be delivered for the desired clinical effect of the **Rhenium-SCT®** procedure would be 50 Gy at the thickest part of the lesion. The material provided by OncoBeta® GmbH, sister companies or its certified sales partners already includes this target radiation dose explicitly.

WARNING

The plausibility of the calculated irradiation time must be checked using the irradiation time charts.

4.9 Removing the *compound*

After the irradiation time has elapsed, the *compound* must be removed from the lesion.

WARNING

The following steps for removing the *compound* must be carried out in the order specified below.

1

Remove the waste container from the **OncoBeta® Waste Station**.

To do so, lift the lid of the lead shield from the **OncoBeta® Waste Station** as shown (1). Remove the waste container (2).

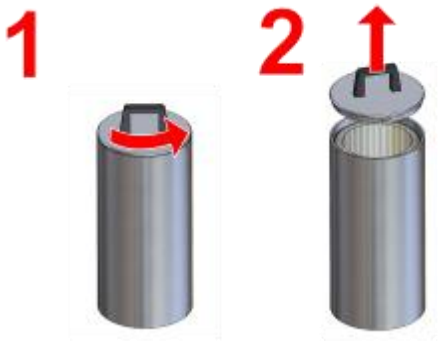
Position the waste container as close as possible to the patient.

2 Open the waste container.

To do so, turn the lid anti-clockwise (1).

Then lift up the lid (2).

The waste container must be fitted with a suitable plastic bag. The plastic bag can be removed easily and prevents the inner surface of the waste container from becoming contaminated.



3 Wait until the irradiation time has elapsed.

Then stop measuring the time.

4 Carefully remove the *foil* together with the applied *compound* from the lesion.

Use suitable instruments, such as long-handled forceps, to help with this.

WARNING

Always use long-handled gripping devices (e.g. forceps) to remove the foil from the lesion.

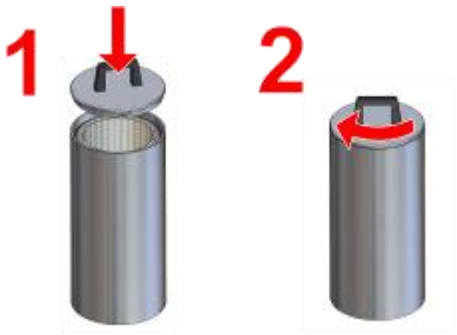
Never touch the *compound* with your hands! Direct contact with the radioactive *compound* may result in the permissible annual dose of radiation to the skin being exceeded in a very short space of time.

5 Dispose of the foil together with the applied *compound* by placing it in the waste container.

6 Close the waste container.

Place the lid on top of the container (1).

Then turn the lid clockwise (2).



7 Take the waste container to a suitable radioactive waste room that is designated for storing decaying radioactive waste.

Remove the plastic bag and its contents and store it in a suitable bin for decaying radioactive waste.

The waste container can now be prepared for reuse by lining it with a new plastic bag.

PLEASE NOTE:

National regulations must be complied with when disposing of radioactive waste**.**

8 Check the room for contamination.

Check all people involved in the process for contamination.

9 Completely remove any sources of contamination found.

Alert others of any remaining contamination.

Further information on how to deal with contaminated materials and on decontamination is available in Chapters 4.12 and 4.14.

4.10 Treating the patient after the procedure

After the procedure has been completed, the patient must be checked for possible contamination or incorporation.

Depending on the type of lesion, further medical care to the lesion (e.g. the treatment of wounds) may be necessary.

PLEASE NOTE

Medical practices are the responsibility of hospital personnel providing the treatment. The clinical procedures described here have been observed in everyday clinical practice; however they do not constitute mandatory requirements set by OncoBeta® GmbH. Hospital personnel have a duty to keep up to date with the latest medical findings and to choose the most appropriate procedures for their patients.

4.11 Emptying the base station

Once all the *carpoules* in the transport unit have been used, the base station must be emptied.

WARNING

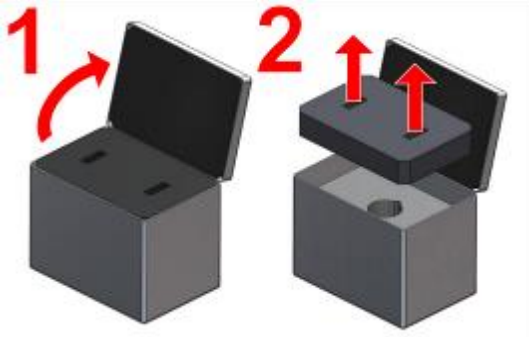
The following steps for emptying the base station must be carried out in the order specified below.

1 Position the *logistics unit* to the right of the *base station*.

2 Open the four locks on the *logistics unit*. To do so, push the safety catch (1) downwards and undo the locks (2).

Open the *logistics unit* (1).

Remove the top block of foam from the *logistics unit* (2).

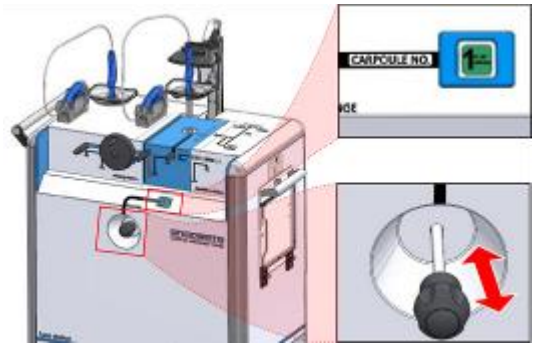


3

Make sure that the *CARPOULE NO.* display on the base station shows the number "**1**". Otherwise, it will not be possible to open the *loading flap* on the *base station*.

To change the *carpoule* number, pull the *push and pull knob* fully out multiple times and push it back in again.

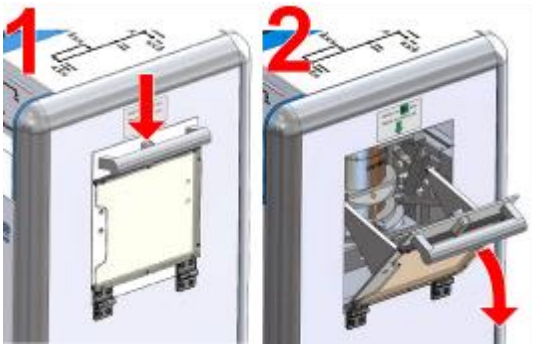
Repeat this process until the *CARPOULE NO.* display shows the number "**1**" ("Flap Opens").



4

Open the *loading flap* on the right-hand side of the *base station*. To do so, push the black *locking button* downwards (1).

Then pull the handle on the *loading flap* (2). This automatically releases the *transport unit*.



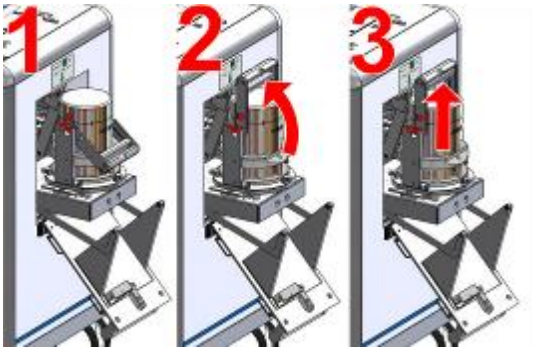
5

Close the lock on the handle of the *transport unit*.

Fold the handle of the *transport unit* upwards (2).

Push the lower segment on the handle upwards (3) until you feel it lock in position.

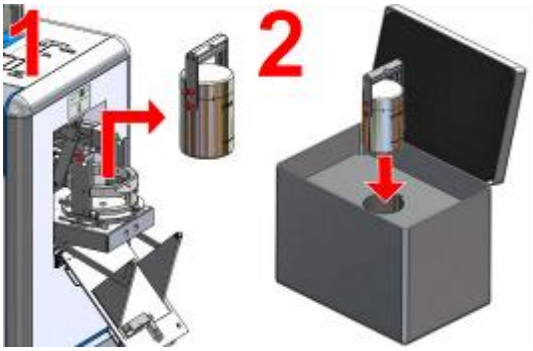
The lid on the *transport unit* is then firmly locked in place.



6

Remove the *transport unit* from the holder on the *base station*.

Place the *transport unit* in the *logistics unit*.



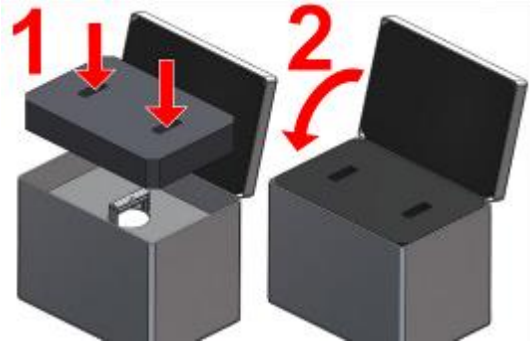
PLEASE NOTE

After the last *carpoule* has been removed, the *transport unit* should be checked for contamination. To do this, fold down the handle and remove the lid by hand to open the *transport unit*. Protective gloves must be worn during this process.

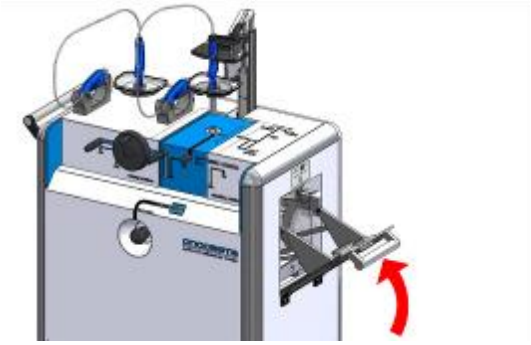
7 Then return the top block of foam to the *logistics unit* (1): The three openings in the foam must be located on the underside of this block.

Close the *logistics unit* lid (2).

Fasten the four locks on the *logistics unit*.



8 Close the *loading flap* on the *base station*.



9 Check the *base station*, *applicator* and room for radioactive contamination.

PLEASE NOTE

When measuring for contamination, make sure there are no sources of radiation in the room. This keeps background radiation to a minimum. For this reason, if the transport container and waste container still contain radioactive material, they must be removed from the room before the reading is taken.

10 Completely remove any sources of contamination found.

Alert others of any remaining contamination.

Further information on how to deal with contaminated materials and on decontamination is available in Chapters 4.12 and 4.14.

4.12 Dealing with contamination

For the protection of patients, personnel and the environment, contamination must be removed as quickly as possible to prevent it from spreading. If it is not possible to decontaminate the affected areas immediately, contaminated objects and clothing must be packed away in a liquid-tight manner and taken to a suitable room for storing decaying radioactive waste. Contaminated rooms must be marked clearly and, if necessary, the affected rooms must be closed off.

PLEASE NOTE

Dealing with contamination is within the remit of the specialist staff responsible for the controlled area. The clinical procedures described here have been observed in everyday clinical practice; however they do not constitute mandatory requirements set by OncoBeta® GmbH. The hospital's radiation protection officer is responsible for establishing appropriate methods and setting out a suitable procedure for dealing with contamination.

4.13 Procedure to follow in the event of incorporation

For the safety of the patient and all personnel involved in the treatment process, it is important that the contingency plan is followed carefully in the event of incorporation of the radioactive material.

Since the radioactive component of the **OncoBeta® Rhenium-188-Compound** is in the form of a Re_2S_7 colloid with a low solubility, it is generally not expected for the incorporated rhenium-188 to distribute itself systematically throughout the body. The steps taken in the event of incorporation should therefore focus on the localised removal of the incorporated material.

PLEASE NOTE

Medical practices are the responsibility of hospital personnel providing the treatment. The clinical procedures described here have been observed in everyday clinical practice; however they do not constitute mandatory requirements set by OncoBeta® GmbH. Hospital personnel have a duty to keep up to date with the latest medical findings and to choose the most appropriate procedures for their patients.

The extent of the incorporation must be calculated and the possible potential damage estimated. Appropriate measures to be taken must be justified by the potential for damage.

Depending on the route of incorporation, measures can be taken to speed up the natural excretion process or attempts can be made to remove remnants of the *compound*, e.g. using tweezers.

4.14 Cleaning the OncoBeta® Application System

The **OncoBeta® Application System** can be cleaned, decontaminated and disinfected by means of wiping for example Kohrsolin® extra tissues. The devices are not suitable for being immersed in water or sterilised. Alcohol-based cleaning products must never be used on acrylic glass surfaces.

Contact OncoBeta® GmbH for an up-to-date list of the suitable cleaning, decontamination and disinfecting agents.

5 Technical data

5.1 Base station

Dimensions and weight (L x W x H)	
Dimensions in the packaging	820 mm x 600 mm x 1400 mm
Dimensions of the station	870 mm x 550 mm x 1350 mm
Weight in the packaging	Approx. 100 kg
Weight without the packaging	Approx. 85 kg

5.2 Applicator

Dimensions and weight (L x W x H)	
Dimensions in the packaging	400 mm x 300 mm x 280 mm
Weight in the packaging	Approx. 1.5 kg
Weight without the packaging	Approx. 850 g