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hyronetic lumeo.
User guide.

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Introduction.

hydronetic lumeo is intended for the fabrication of a **TT check socket** made of a fiberglass composite. An impression is taken of the residual limb and a check socket is manufactured **during the patient's visit** – completely without plaster and with minimal workshop equipment. The check socket is intended for holding a residual limb with a liner. Instead of plaster, a resin-impregnated, glass fiber-reinforced sock is used – the ***lumeo*** casting sock. This is molded under full load with hydrostatic pressure and cures under UV light at the touch of a button. This type of impression maps the soft tissue situation, bony structures and scar tissue under realistic conditions (stance phase loading). The result is a glass fiber-reinforced check socket. The socket can then be thermoplastically re-shaped, sanded and built up. This means a complete check socket treatment can be carried out during the first appointment with the patient. ***hydronetic lumeo*** can be used for both stationary and mobile use, making it ideal for flexible day-to-day treatment.

Instructions for use.

Preparing the system

The workplace is prepared for taking impressions with the following materials:

- Power supply unit
- Vector tower
- Receiving cup
- Silicone cushion
- ***lumeo*** casting sock (699P1=*)
- Plaster insulating grease (633F103=1)
- Cutting aid (743Y962=1)
- Nylon stockinette (99B25)
- Airtight foil (616F39=30000x300)
- Spray Adhesive (636K41)
- Casting bags (642T6=350X500X0.25)
- dummy set Resin casting (743Y959=1)
- Stretch foil (642F18) with dispenser (642Y40)
- Disposable gloves nitrile (641H46=*)
- Respiratory filter mask (756Y80) with Combination filter (756Z14=1)
- Permanent marker
- Spring-tensioned measuring tape (743B4)
- Folding rule (662M1)
- Callipers (743S10)
- Scissors

hydronetic lumeo is filled with distilled water in preparation for the patient appointment. The device must not be filled under pressure – therefore, ***hydronetic lumeo*** should be refueled using the lever and a suction hose or filled using a watering can or, if necessary, a funnel.

Filling using a suction hose

- Connect the hose to the hose coupling on the control side.
- Lever setting to “Empty” and “External Circuit”
- Attach and operate the hand pump.
  Important: Pump slowly so that no air is introduced (each pump stroke moves 0.33 l).
- Fill at least up to the red line (see side indicator). Visible water in the pressure gauge (pressure indicator) is normal and harmless.

Filling using a watering can or funnel

- Open the filling opening on the left above the control panel.
- Fill at least up to the red line (see side indicator). Visible water in the pressure gauge (pressure indicator) is normal and harmless.

Notice: The temperature during the curing process is influenced by the temperature of the water added. To avoid excessive heating and possible injury to the patient, **use water that is as cold as possible**.

Ventilating the inner tank

1. Next, vent the inner tank. To do this, set the lever to “Fill” and “Internal Circuit.”
2. Open the vent screw above the control panel.
3. Use the hand pump to pump all the water from the outer tank into the inner tank. This process requires approx. 40 pump strokes. Important: Continue pumping until all the air in the inner tank has escaped through the opening.
4. Close the vent screw.

Emptying the inner tank

1. Set the lever settings to “Empty” and “Internal Circuit.”
2. Pump until the internal tank is completely empty.

Further preparations

- Prepare the workplace by protecting the floor and laying out all the necessary materials (as listed above).
- Plug the power supply unit into the power outlet.
- Notice for the patient before the appointment: The patient should wear shorts if possible. The patient’s clothing may need to be protected.

Adjusting the entry height.

The system height is adjusted based on the height of the thighs. To do this, the patient sits in front of the device with a right angle (90°) between the upper and lower legs. The rollers on the adjustment feet always point away from the tank/away from the patient.

The feet are adjusted so that the upper edge of the system is just above the edge of the thigh of the seated patient.

The feet can be easily pulled down, removed (if the device tilts to one side) and reassembled.

Notice: Height differences can be compensated for by wearing shoes.

Anamnesis and pressure determination.

As a first step, perform an anamnesis with the patient (**anamnesis data sheet**). Pay particular attention to **painful areas, changes in the residual limb, general mobility and constitution**. The maximum pressure for the curing process is determined by using the **pressure calculation table**.
Information required for pressure calculation:

- Type of residual limb tissue (hard, medium, soft)
- Body weight without prosthesis
- Mobility grade
- Circumference (see image below)

In addition to the circumference, the residual limb length must also be measured to subsequently calculate the height of the vector tower.
Here are the instructions for taking both measurements:

Circumference: Perform the measurement **directly on the skin**. Place the tailor's tape measure (743B1) around the circumference of the residual limb at the level **of the MPT without constricting the tissue** and measure the circumference of the residual limb. The measurement can be repeated 2–3 times to determine the correct value.

Residual limb length: Take the measurement using **a liner**. Measure the residual limb length from the distal end of the residual limb to 3 cm above the patella using a folding rule (e.g. 662M1).

The patient's weight and residual limb length can be used to find an initial value in the pressure table (see p. 20). Calculate the final pressure depending on the mobility grade and type of residual limb tissue (see p. 20).

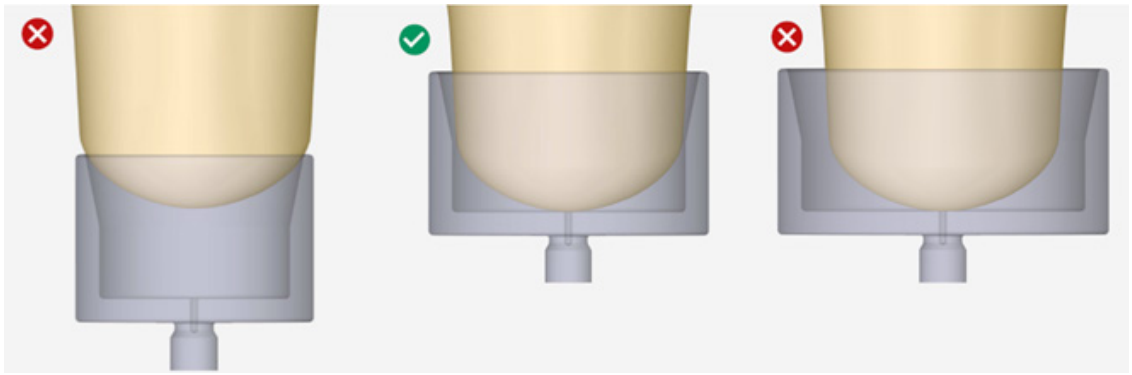
Notice: The result for the pressure is a non-binding guideline. It serves as a starting point when beginning to use the product. As you gain more experience, this will help you to determine the optimum pressure more effectively.

Selecting the receiving cup and silicone cushion.

To ensure an optimal impression, select a compatible receiving cup. The **distal end of the residual limb should touch the bottom of the cup** without compressing the residual limb.

There must be a gap between the liner and the rim of the cup. This **distance should be minimal**.

- The residual limb must not come into contact with the rim of the cup, as this could cause edges to form.



In addition, select and insert the silicone cushion that matches the cup.

Calculating the vector tower height.

The vector tower height consists of the distal end cap, all required height compensation parts and the receiving cup. The height is calculated as follows:

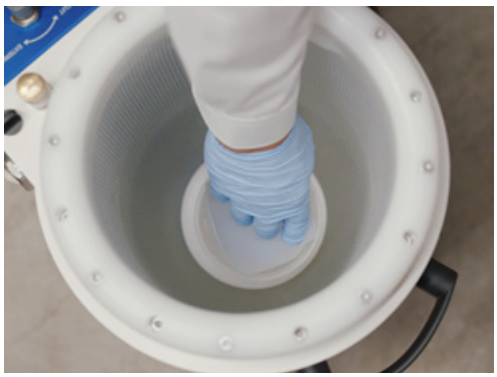
→ 48 cm system internal height (internal height of the white tank) – residual limb length

- **Notice:** The **minimum height** of the vector tower is determined by the distal end cap (7 cm) and the receiving cup (7 cm) (this results in a **minimum height of 14 cm** and a **maximum residual limb length of 34 cm**) → long residual limbs may therefore be a contraindication for use)
  - If calculated vector tower height < minimum height → ***hydronetic lumeo*** cannot be used

Configuring settings.

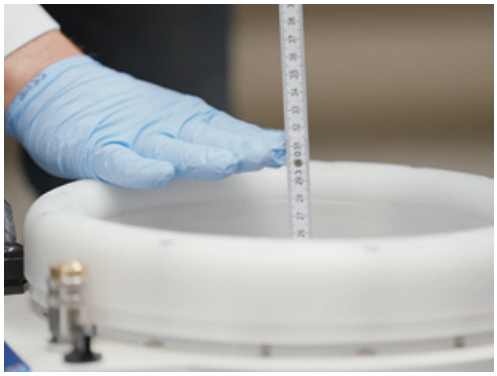
After the vector tower height has been calculated correctly, the following preparations are made:

The vector tower is screwed together. It consists of the height compensation discs (4 x 3 cm, 2 x 6 cm), the distal end cap and the receiving cup, which are assembled to the correct length. The distal end cap and receiving cup must always be screwed together.



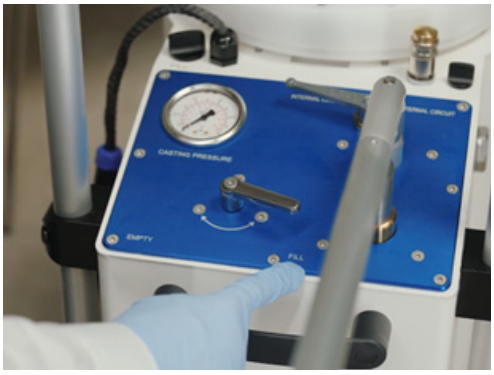
Insert the vector tower into the device.
Insert the silicone cushion.

- **Ensure that it is positioned centrally**.



Remeasure the height.

- **Note:** Always insert the silicone cushion for the follow-up measurement to ensure that the measured residual limb length fits into the system.



Set the levers to “Fill” and “Internal Circuit”.

Use the manual pump to pump water into the tank.

Pump water into the inner tank until the membrane reaches the upper rim of the cup and rests against it.

Grease the membrane with plaster insulating grease (633F103=1) up to the cup.

- **Important:** Only the working area may be greased. The vector tower, the cup and the membrane below the cup rim should not be greased.

- **Important:** The patient must be informed about the further course of treatment. Performing a **test run** may be carried out if necessary, otherwise the pressure could become very unfamiliar or even painful!

Selecting the size of the *lumeo* casting sock.

The ***lumeo*** casting sock (699P1=*) is available in sizes S to XL:

Article Number	Size	Circumference (cm)
699P1=1	S	25–35
699P1=2	M	30–45
699P1=3	L	35–50
699P1=4	XL	40-55

Determine the correct size of the resin casting sock using the resin casting sock dummy set (743Y959=1) – the **patient wears a liner** for this. The previously **measured circumference** can also be used as a guide.

Preparing for the *lumeo* casting sock.

Before putting the resin casting socks on the patient, the following preparations must be made:

The patient puts on their **liner**.

The **airtight foil** (616F39=30000x300) is used for **vacuum supplies**. Cut the foil into a trapezoidal shape and wrap it around the residual limb from behind. **Ensure that the foil overlaps by 3 cm**.

- **Notice:** Apply the foil to the **lower edge of the patella**.
- The airtight foil is used for airtight socket fabrication. The foil is only needed in the lower area of the socket and must not project beyond the socket brim, as this could cause delamination in the socket brim area.

Trapezoidal cut (resulting from the shape of the residual limb).

Apply the cutting aid (743Y962=1) to the patella and secure with stretch foil (642F18).

- **Important: The residual limb must not be pre-compressed by the foil.**
- **Notice:** Careful fixation of the cutting aid is especially important with smooth liners!

Wrap the entire residual limb in stretch foil.

Put on a nylon stockinette (99B25).

Re-wrap with bundle stretch foil.

Markings can be made on the foil with a permanent marker to indicate the lower edge of the patella and the trim line.

Protective precautions: Put on three pairs of nitrile single-use gloves (641H46=*). Also observe the **safety notes** in the instructions for use and the safety data sheet. The room should be well ventilated. If this is not the case, a suction booth should be used. If this cannot be guaranteed either, the patient and technician should wear a special breathing mask (756Y80) with a combination filter (756Z14=1). Protective clothing is recommended.

Putting on the *lumeo* casting socks.

The silver packaging of the ***lumeo*** casting socks (699P1=*) is cut open on three sides.

This can then be used as a base.

- **Important:** It is essential to follow the correct order when putting on the resin casting socks. The order is indicated by an arrow in the packaging. Each package contains six resin casting socks.

Ensure that the seam is aligned.

- **Important:** Roll all socks at least 5 cm higher than the marked socket brim.

Put on the **first three socks**. The **seam alignment is vertical** and slightly offset from each other.

- **Important:** The seams should not overlap, as resin can collect here (risk of overheating) and it will otherwise become too bulky.

After the first three socks the first layer of protective gloves can be removed. Afterwards wrap the airtight foil around the residual limb from behind. As with cutting, **ensure that the foil overlaps**.

- **Notice:** Apply the foil to the lower edge of the patella. The distal foil that protrudes can be secured with the 636K41 spray adhesive.

The hole in the fourth sock indicates the change in direction of the seams.

From the fourth sock onwards, the seam alignment is horizontal The seams of the fourth to sixth socks are again parallel and slightly offset from each other.

Once all six socks have been put on the next layer of protective gloves can be removed. Now wrap the residual limb again with plastic wrap.

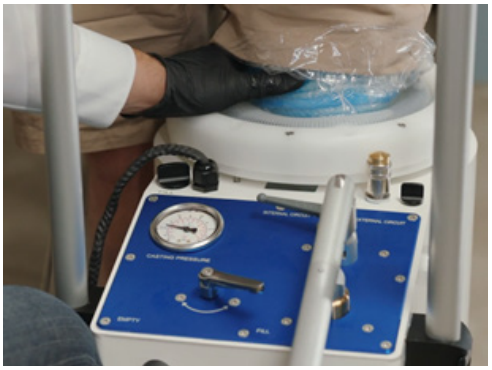
Pull the casting bag over the top.

Preparations before the curing process.

- **Important:** Never leave the patient alone once they are standing in the device!

The OTM guides the patient into the center of the system. The OTM's hand remains on the patient.

- **Note:** Insert the residual limb with **light contact** with the relief silicone cushion. **The patient must not put their full weight on the residual limb yet!**



When the patient stands comfortably (weight bearing not yet fully on the residual limb), the pressure is increased and the inner tank is therefore filled with water until the residual limb moves slightly upwards.

- **Important:** Lever still set to "Fill" and "Internal Circuit"

- **Important:** Especially at the beginning, when the full pressure is not yet exerted on the residual limb or the full water pressure has not yet been generated, the OTM's hand should hold the residual limb slightly so that the patient is not pushed upwards out of the device.

- **Important:** The patient should **gradually increase the load on the residual limb after lifting it**. At a pressure of **0.4 bar at the latest, the patient should be standing fully on the residual limb and no longer on the floor with the other leg**. (= Full load bearing of the residual limb). The device is filled further until the calculated pressure is reached.

- **Important:** If the patient reacts sensitively to the applied pressure, reduce the pressure as little as possible.
- **Notice:** It is important to fully load the residual limb (=full load), as this resembles a realistic load (stance phase loading). This is the only way to optimally visualize the soft tissue situation, bony structures and scar tissue.
- **Note:** In the event of overpressure – from 1.3 bar – the membrane will tear out of the 10 mm thread at the bottom; from 2.3 bar, the membrane will tear – please note this important information!

Curing process.

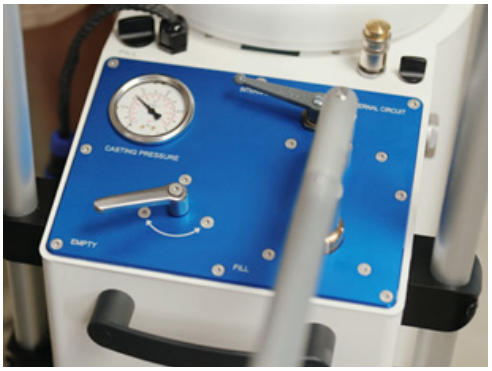
Switch on the power supply unit on the power supply box. The power switch lights up. The curing process using UV lamps begins when the start button is pressed. The UV lamps shine for a period of 5 minutes. They must be illuminated **2x for 5 minutes each time, resulting in a total illumination time of 10 minutes!**

- **Important:** Please use the enclosed radiation protection.
- **Important:** The **pressure must be continuously adjusted during curing by pumping manually!** This ensures that the technician remains with the patient throughout the entire curing process, monitors the progress and can intervene immediately in an emergency (e.g. in case of circulatory problems or overheating).

- **Notice:** Even though the process should not be strenuous in most cases, it may be advisable to offer the patient a glass of water.
- If the patient **interrupts the curing process**, slowly move the lever to “Empty” (opening it too quickly could cause circulatory problems in rare cases due to the sharp drop in pressure). If necessary, pump again and instruct the patient not to pull on the residual limb (as the water pressure is too high and there is a risk of injury).

After curing.

Once the LEDs turn off, the curing process is complete. The patient can reduce the load on the residual limb. The power supply unit can be switched off.



First, the water pressure is released. To do this, the **user must stand firmly** and be secured if necessary. Set the pump setting to “Empty.” The “Internal Circuit” setting remains unchanged.

Pumping releases the pressure and the membrane separates from the residual limb.

The patient can get out of the system and sit down.

Pull off and dispose of the casting bag.

Pull the cutting aid up and out.

The cured socket can be carefully pulled off the residual limb.

This is what the result should look like.

After each use, empty the inner tank completely and then remove the vector tower (only remove once the pressure tank has been completely removed, as otherwise the distal end cap will be held in place by the water pressure). Carefully wipe the membrane.

All tools and surfaces that have come into contact with the resin should also be cleaned with isopropyl alcohol and a soft cloth.

Plaster cast with *hydronetic*.

To make a **plaster cast** with the device, **follow the instructions for use up to and including p. 52** and the **user guide up to and including p. 10.** Then plaster the residual limb as usual and pull a foil bag over it to protect the membrane. Place the patient in the system and follow the instructions for use from p. 57 or in the user guide from p. 14.

- The **UV light does not have to be switched on**, but the patient should also put the **full load on the residual limb** if possible.
- As soon as the plaster has set, the patient can step out of the system.
- **Note on curing speed:** For better process control, **use cold water** to slow the curing speed.

Post-curing and processing of the check socket.

Before processing and aligning the trial prosthesis, the check socket must be must be post-cured. This requires the following steps:

- Saw off the uncured part of the socket (e.g. with an oscillating saw).
- Grind the socket brim free of burrs with a milling machine.
- Place the check socket in a casting bag (642T6=350X500X0.25) with the socket brim facing down.
- Place the check socket in the casting bag into the pressure tank with the distal end facing up.
- Cure the check socket for **5 minutes**.
  Important: The socket must not have sharp edges, as these could damage the membrane.
- The check socket is now fully cured.

Aligning the trial prosthesis and fitting.

- **Important:** Never leave the patient alone once they are standing in the device!

Aligning the trial prosthesis with PROSA Assembly.

Fitting.

If necessary, rework the check socket.

Completed check socket fitting.

Device aftercare.

See the instructions for use for detailed information on care and maintenance. Apart from that, some important notes are already listed here.

It is essential to keep the membrane clean, as it could be damaged by dirt residues.

The **following service and maintenance rules** apply in general:

- The **water should be replaced monthly**. The replacement can be carried out by the technician. For emptying, see the instructions for use.
- The **membrane must be replaced every two years**, but the **first time after the first year of use**. The membrane can be replaced by the technician themselves or by the Ottobock Equipment Service (customersupport.pe@ottobock.com). For membrane replacement see the instructions for use.
- The **pressure tank** (i.e. membrane with complete inner tank, clamping rings and screws) **must be replaced every two years**, the first time after two years of use (the membrane and pressure tank are replaced alternately each year). The pressure tank can be performed by the technician or by contacting the Ottobock Equipment Service (customersupport.pe@ottobock.com). For information on replacing the inner tank, see the instructions for use.
- The **fine fuse** only needs to be replaced **if it is defective**.

hydronetic lumeo.
Table for pressure setting.

Weight in kg	Circumference in mm																														
	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580
30	0.41	0.39	0.36	0.34	0.32	0.30	0.28	0.27	0.25																						
35	0.48	0.45	0.42	0.39	0.37	0.35	0.33	0.31	0.29	0.28	0.26																				
40	0.55	0.52	0.48	0.45	0.42	0.40	0.38	0.35	0.33	0.32	0.30	0.29	0.27	0.26																	
45	0.62	0.58	0.54	0.51	0.48	0.45	0.42	0.40	0.38	0.36	0.34	0.32	0.30	0.29	0.28	0.26	0.25														
50	0.69	0.64	0.60	0.56	0.53	0.50	0.47	0.44	0.42	0.40	0.38	0.36	0.34	0.32	0.31	0.29	0.28	0.27	0.26												
55	0.76	0.71	0.66	0.62	0.58	0.55	0.52	0.49	0.46	0.44	0.41	0.39	0.37	0.35	0.34	0.32	0.31	0.29	0.28	0.27	0.26										
60	0.83	0.77	0.72	0.68	0.64	0.60	0.56	0.53	0.50	0.48	0.45	0.43	0.41	0.39	0.37	0.35	0.34	0.32	0.31	0.29	0.28	0.27	0.26	0.25							
65	0.90	0.84	0.78	0.73	0.69	0.65	0.61	0.58	0.54	0.51	0.49	0.46	0.44	0.42	0.40	0.38	0.36	0.35	0.33	0.32	0.31	0.29	0.28	0.27	0.26	0.25					
70		0.90	0.84	0.79	0.74	0.70	0.66	0.62	0.59	0.55	0.53	0.50	0.47	0.45	0.43	0.41	0.39	0.37	0.36	0.34	0.33	0.32	0.30	0.29	0.28	0.27	0.26	0.25			
75			0.90	0.85	0.79	0.75	0.70	0.66	0.63	0.59	0.56	0.53	0.51	0.48	0.46	0.44	0.42	0.40	0.38	0.37	0.35	0.34	0.33	0.31	0.30	0.29	0.28	0.27	0.26	0.25	
80				0.90	0.85	0.80	0.75	0.71	0.67	0.63	0.60	0.57	0.54	0.52	0.49	0.47	0.45	0.43	0.41	0.39	0.38	0.36	0.35	0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26
85					0.90	0.85	0.80	0.75	0.71	0.67	0.64	0.61	0.58	0.55	0.52	0.50	0.48	0.46	0.44	0.42	0.40	0.38	0.37	0.35	0.34	0.33	0.32	0.30	0.29	0.28	0.27
90						0.90	0.84	0.80	0.75	0.71	0.68	0.64	0.61	0.58	0.55	0.53	0.50	0.48	0.46	0.44	0.42	0.41	0.39	0.38	0.36	0.35	0.33	0.32	0.31	0.30	0.29
95						0.95	0.89	0.84	0.79	0.75	0.71	0.68	0.64	0.61	0.58	0.56	0.53	0.51	0.49	0.47	0.45	0.43	0.41	0.40	0.38	0.37	0.35	0.34	0.33	0.32	0.31
100							0.94	0.89	0.84	0.79	0.75	0.71	0.68	0.65	0.61	0.59	0.56	0.54	0.51	0.49	0.47	0.45	0.43	0.42	0.40	0.39	0.37	0.36	0.35	0.33	0.32
105								0.93	0.88	0.83	0.79	0.75	0.71	0.68	0.65	0.62	0.59	0.56	0.54	0.52	0.49	0.47	0.46	0.44	0.42	0.41	0.39	0.38	0.36	0.35	0.34
110									0.92	0.87	0.83	0.78	0.75	0.71	0.68	0.65	0.62	0.59	0.56	0.54	0.52	0.50	0.48	0.46	0.44	0.42	0.41	0.39	0.38	0.37	0.35
115										0.91	0.86	0.82	0.78	0.74	0.71	0.67	0.64	0.62	0.59	0.56	0.54	0.52	0.50	0.48	0.46	0.44	0.43	0.41	0.40	0.38	0.37
120											0.90	0.86	0.81	0.77	0.74	0.70	0.67	0.64	0.61	0.59	0.56	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.41	0.40	0.39
125											0.94	0.89	0.85	0.81	0.77	0.73	0.70	0.67	0.64	0.61	0.59	0.56	0.54	0.52	0.50	0.48	0.46	0.45	0.43	0.42	0.40
130												0.93	0.88	0.84	0.80	0.76	0.73	0.70	0.67	0.64	0.61	0.59	0.56	0.54	0.52	0.50	0.48	0.47	0.45	0.43	0.42
135													0.91	0.87	0.83	0.79	0.76	0.72	0.69	0.66	0.64	0.61	0.59	0.56	0.54	0.52	0.50	0.48	0.47	0.45	0.44
140													0.95	0.90	0.86	0.82	0.78	0.75	0.72	0.69	0.66	0.63	0.61	0.58	0.56	0.54	0.52	0.50	0.48	0.47	0.45
150															0.92	0.88	0.84	0.80	0.77	0.74	0.71	0.68	0.65	0.63	0.60	0.58	0.56	0.54	0.52	0.50	0.48

These values apply for a mobility grade 2 patient and solid residual limb tissue.
For mobility grade 1: -0.02 bar
For mobility grade 3: +0.02 bar
For mobility grade 4: +0.04 bar
For medium residual limb tissue: +0.02 bar
For soft residual limb tissue: +0.04 bar

Sample patient:
Weight 90 kg, residual limb circumference 360 mm, mobility grade 3, residual limb tissue, medium
0.75 bar (from table) + 0.02 bar (mobility grade 3) + 0.02 bar (medium residual limb tissue)

These values are not binding.
Notice: Patients may respond to pressure differently, please take the patient's condition into account.

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