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TASKA™

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Fabrication Manual

V1.2

TASKA™

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Disclaimer

This manual is not a substitute for formal training. It is a guide only.

This manual is a prompt for trained technicians regarding the unique features and best use of TASKA Batteries, Power Switch and Lamination Collar when fabricating a transradial dual-shell myoelectric prosthesis with a quick disconnect wrist.

Every prosthesis is unique, requiring technical expertise to fulfil successful fabrication. The design outcome and process used to achieve it is the responsibility of the prosthetic technician.

TASKA Prosthetics provides this manual as a guide for the best use of the prescribed TASKA products and accepts no responsibility for incorrect fabrication or misusing the components when referring to this manual.

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Contents

Introduction

Overview

This will cover the use of:

- TASKA Lamination Collar and fabrication aids,
- TASKA Power Switch, including Lamination Dummies and drill template,
- TASKA Batteries and Lamination Dummies.

The lamination process described in this guide is based on a thermoplastic check socket used to create a dual shell prosthesis with a rigid inner, fabricated around a foam accessory model core. This involves:

- Creating a check prosthesis (not shown in detail),
- Creating a reference of the check prosthesis by using the TASKA Lamination Collar and a vertical replication jig,
- Creating a negative blank of the residuum and removing the initial check prosthesis,
- Fabricating a rigid inner socket,
- Fabricating and shaping an accessory model using foam (or other suitable medium) and selecting appropriate positions for batteries and Power Switch,
- Laminating an outer socket to create structure and connect the inner socket and TASKA Lamination Collar,
- Cleaning and finishing the outer socket,
- Mounting final components.

Local techniques will vary from those shown in the guide. This guide's purpose is to understand better the unique requirements for using TASKA products.

The process described in this manual is a 'Duplication Process', using a vertical fabrication jig to determine the relative location of each critical component of the prosthesis. This process requires a check socket using the TASKA Lamination Collar.

Other fabrication processes are possible using these components.

This guide is not specifically for fabricating the TASKA Low Profile Lamination Collar. However, these techniques are replicable using the Low Profile Lamination Collar, including the 'tie-in groove' feature.

Refer to the Low Profile Care & Maintenance Guide for lamination recommendations.

Terminology

Accessory model - A negative impression of the final outer socket used to create the final shape of the prosthesis.

Check socket - A trial connection that joins the TASKA Hand, or another terminal device, to the interim inner socket for testing electrode placement, weight, geometry and function of the final system with the patient. These can be made of various materials, depending on the length of use required for trialling the prosthesis.
The check socket is also known as an **interum socket**.

Inner socket - A composite component used to structurally support the socket liner or interface between the rigid socket and residual limb.

Interrum residum - A plaster model created during the replication process which imitates the residual limb and any spacing that the prosthetist has added.

Lamination Collar - The structural component that joins the prosthesis to the TASKA Hand.

Outer socket - A composite component that provides structure between the inner socket and Lamination Collar.

Replication jig - Commonly used for lower limb prosthesis fabrication, this adjustable frame creates references between components for replication purposes.

TASKA Lamination Collar

Product Summary

The TASKA Lamination Collar completes the waterproof solution with the IP67 interface to the TASKA HandGen2.

- Creates an enclosed waterproof seal through the wrist, even around the Coaxial Plug to prevent sweat damage,
- Flexible Coaxial element prevents plug breakages (4 and 6 band Coaxial Plugs available),
- Enclosed seal solution prevents damage to the TASKA Seal Ring when used in dirty environments,
- Advanced lamination aids make lamination easy, accurate and clean,
- TASKA Seal Ring and replacements at annual services included.

Lamination

The TASKA Lamination Collar is laminated similarly to most industry-standard Quick Disconnect Collars.

The Lamination Collar is easy to laminate using positioning and fabrication aids. This is known as the duplication process and is the prescribed process in this manual. After the interim inner socket is completed and tested, this process verifies that the electrode placement is correct.

The Lamination Collar can also be installed into pre-fabricated forearms or adapters in elbow systems for added compatibility.

Lamination Bolt
Tightening the Lamination Bolt secures the entire assembly during fabrication.

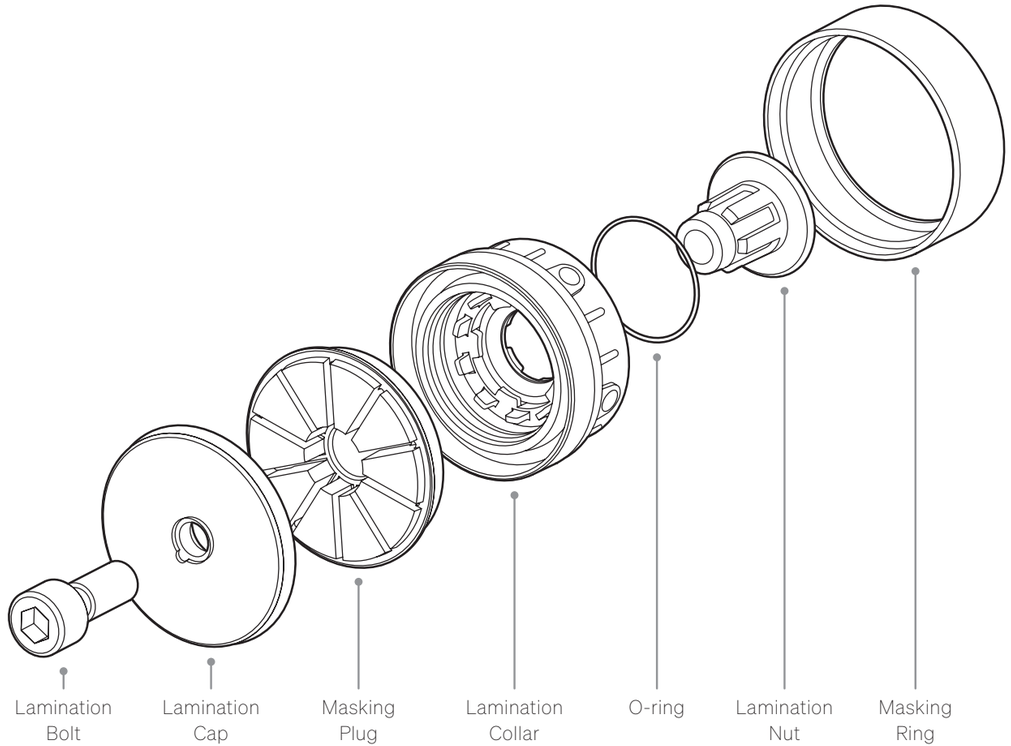
Lamination Cap
A ridged cap for securing to duplication jigs (Hosmer or similar).

Masking Plug
Soft plug fills most of the voids within the wrist. There are sealing faces at the top and bottom to keep resin out and contain any remaining air.

Lamination Nut
A threaded cap for the bottom of the assembly. This nut allows the bolt to compress the assembly and keep it sealed.

The nut also contains alignment features to form an impression on wax or plaster accessory models.

Masking Ring
A moulded ring stretching around the outside of the wrist, protecting the outer detail. This ring stops wax/foam from getting into lamination details and saves time when shaping the arm.



Pre-fabricated forearms

The lamination collar is detachable from the lamination ring. By removing the 5x screws to retain the lamination ring, this can then be installed in some prefabricated forearms.

Using an adapter brings the diameter to 50mm. Once screwed into place, the Lamination Collar will form a seal with the adapter, ready to be glued into the prefabricated forearm.*

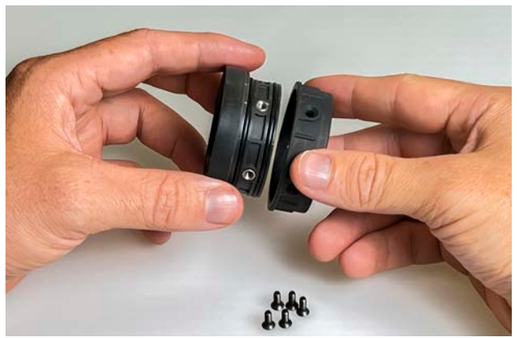
Direct compatibility (no adapter required)

- Utah Arm 3/3+

Indirect compatibility (adapter required)

- Boston/Espire Elbow range, 50mm
- Dynamic Arm/Dynamic Arm Plus for 50mm Lamination Rings**
- ErgoArm Elbow for 50mm Lamination Rings**

Contact your TASKA representative for more details, including ordering codes for adapters.



Removing the 5x perimeter screws and Lamination Ring exposes the inner seal.

The components assembled together.

* TASKA cannot endorse the waterproof connection to the forearm when using the adapter.
** Check with the manufacturer about using this elbow with multiarticulating myoelectric hands.

Power Switch

Install a TASKA Power Switch using the Lamination Dummies to create an impression on the final outer prosthesis, cut out using the Power Switch drill template.

Refer to pages 43 - 45 for the use of the Lamination Dummies.

Power Switch drill template

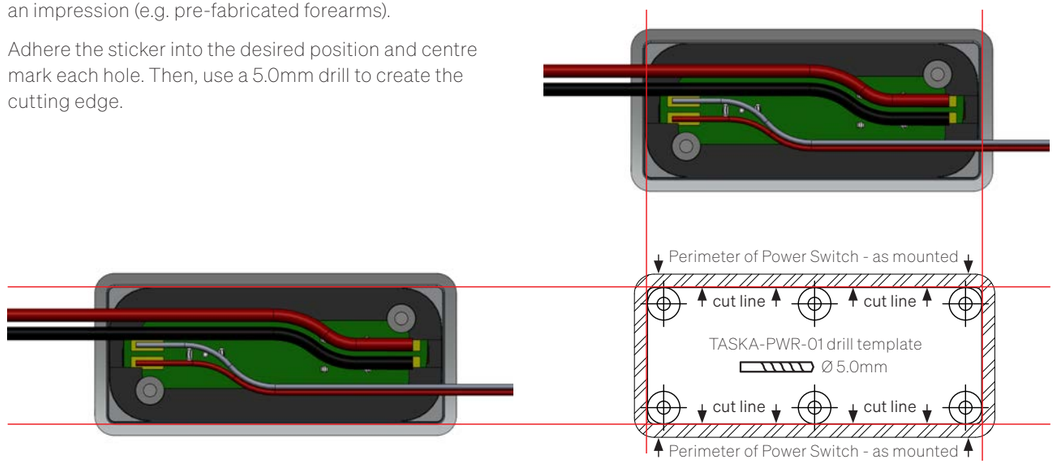
Use the drill template to mount the Power Switch to sockets that do not need the Lamination Dummy to create an impression (e.g. pre-fabricated forearms).

Adhere the sticker into the desired position and centre mark each hole. Then, use a 5.0mm drill to create the cutting edge.

Only cut inside the CUTLINE as marked below. Do not cut to the perimeter line marked below. If the hole is too big, the socket might need rebuilding.

The template is for a nominal external diameter of 2" (50.8mm). If the prosthesis is bigger, begin 1-2mm inside the CUTLINE and trial fit the Power Switch.

Refer to pages 71 - 72 for the Power Switch drill template process.



Batteries

Design the prosthesis so that the batteries can be removed and replaced annually. A new TASKA Battery is included with each applicable annual service, which helps maximise the life of the hand.

Every TASKA Hand comes with 2x battery Lamination Dummies, each representing one of the two TASKA Battery cells. Before assembly, estimate the final mounting position to ensure the batteries fit inside the prosthesis.

- The batteries are not flexible. Do not bend the batteries.
- When required, use the Lamination Dummies to laminate in a flat profile to help reduce build height.
- For double-height, adhere the dummies together.

- Shape the accessory model for smooth transitions to the battery surfaces.
- Take care with the edges of the Lamination Dummies, rounding them off to prevent punctures in the PVC lamination bag.
- Do not glue or laminate the batteries into the prosthesis. Instead, secure in place using Velcro or a light double-sided adhesive tape.
- Each cell is joined by a 12cm wire – ensure there is no wire strain when installing.
- Refer to the Appropriate Use Guidelines for recommendations around disposing of used batteries.
- Consider placement carefully when designing the socket to prevent sweat and water from contacting and damaging the batteries.

	BATTERY	LAMINATION DUMMY
Thickness	7 mm	7.5 mm
Length	78 mm	78.5 mm
Width	43 mm	43.5 mm

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Stage 1
Creating a check socket

Assemble check socket

The method shown above uses a PVC pipe adhered to the inner check socket.

Adhere the Lamination Collar into the check socket using an adhesive that can be easily separated or removed.

After testing the check socket, remove the Lamination Collar from the socket.

Please note: orientation is not essential, as the hand will rotate 360 degrees.

Prepare for lamination

Re-assemble the Lamination Dummies onto the Lamination Collar in preparation for fabrication.

Begin by inserting the small O-ring into the collar, seated inside the cap as shown.

Reassemble the lamination accessories

Insert the Lamination Nut to be seated flush into the back of the collar.

Press the Masking Plug into the Lamination Collar and fit the red Lamination Cap into the grooves as shown above.

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Stage 2
Replicating the check socket

The Lamination Collar masking accessories make replication of the socket accurate and easy. Use the following instructions to align the Lamination Collar with the inner socket.

A vertical lamination jig helps position the two components and is the most efficient way to replicate the test socket accurately.

Upper support rod
This hollow rod supports the plaster cast taken from the inner socket and supports the model during fabrication.

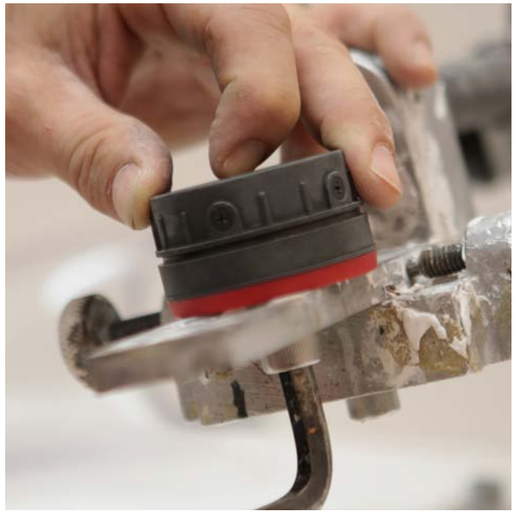
Inner socket
A thermoplastic shell taken from the residuum of the patient. It will also contain electrode placement (not shown).

Check socket
Replicates the physical location of the terminal device to the residuum to determine the final fit and function.

Replication jig frame
Allows the foot-plate and support rod to be referenced accurately to one another while allowing component movement for subsequent fabrication steps.

TASKA Lamination Collar
Quick Disconnect Lamination Collar used to mount the TASKA Hand to the laminated prosthesis.

Foot plate
This plate can adjust angle, lateral position and height to set the exact position of the Lamination Collar assembly as shown.



Secure Lamination Collar onto replication jig

Mount the Lamination Collar to the lower plate on a vertical fabrication jig or another suitable replication system.

The rotational position is not critical to the finished position of the Lamination Collar.

Tighten using a 8mm or 5/16” hex key. The Lamination Collar should not rotate and not compress the internal components.

Do not overtighten.

Mount the check socket back onto the Lamination Collar

Set the interim socket in the same position on the Lamination Collar.

Insert the upper support rod into the interim liner in preparation for plaster.

Adjust the footplate and upper support rod as required.

Secure the Lamination Collar and check socket together

Bond or tape the two components together to prevent movement during the pouring process.

Tape is easier to remove when the plaster pour separates from the interim socket.

Create a mask for the plaster pour process

Ensure adequate volume beyond the inner interim socket to allow for trim line definitions.

Seal the bottom perimeter using thick paper style tape to prevent leakages.

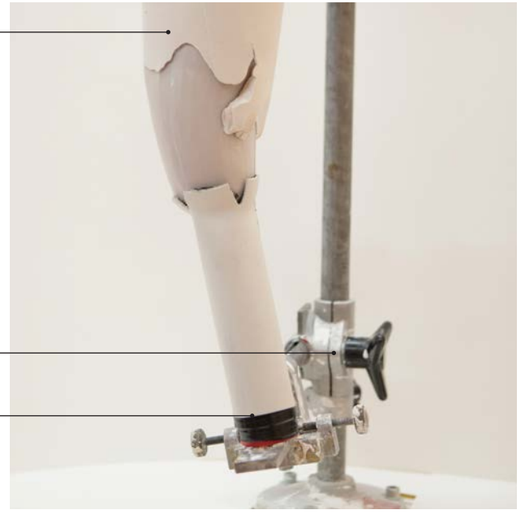
Pour plaster into the interim inner socket

To ensure a good pour, try moving the mounting rod out of the way.

Gently tap the assembly to remove air bubbles that may form on the inside of the casting.

Reinsert the mounting rod and check the model has not moved relative to the Lamination Collar.

Leave to cure.

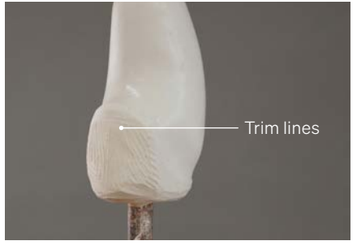


Remove the inner socket replication from the jig

Once the plaster has cured, ensure the vertical fabrication jig positions are securely marked.

The interim socket can be removed from the Lamination Collar and discarded.

Leave the Lamination Collar attached to the vertical fabrication jig by separating at the tape join.

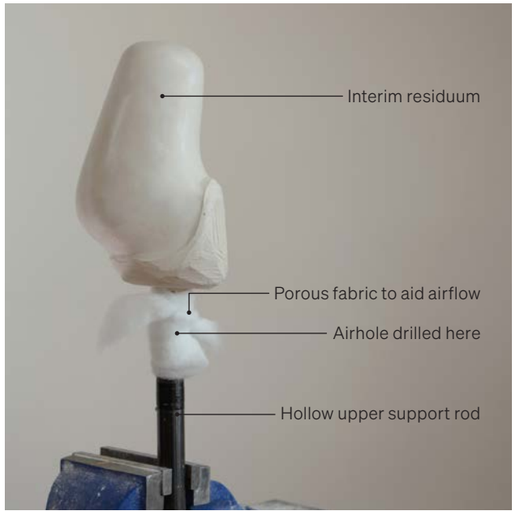


Remove excess plaster from the original inner socket

Define trim lines around the perimeter where possible and remove excess plaster.

Heat the casting gently to soften the thermoplastic for removal.

Remove the thermoplastic, taking care as the components will be hot. Use appropriate PPE.



Prepare the plaster model for the inner socket lamination

Mount the imitation residuum into a vacuum-assisted vice and drill a hole about 1 inch below the casting base into the mounting rod.

Apply a mould release to the surface to aid the PVC bag application.

Wrap a piece of porous fabric to allow the vacuum to flow through the lamination as shown. This fabric should cover the hole.

Pull a PVC bag over the imitation residuum

Use talcum powder to lubricate the bag and prevent the bag from tearing.

Carefully stretch the bag over the imitation residuum and tie the bag off below the hole.

Apply a vacuum through the hollow upper support rod.

Use a heat gun to move out any creases gently.

Pull a nylon stocking over the PVC bag and secure the stocking

Pull the stocking over the bag until it is below the end of the casting.

Tie the other end off above the lamination using a supporting clip as shown.

Secure the bottom end using a tight wrap of adhesive tape.

Apply a layer of fibreglass cloth

Use a light spray of aerosol adhesive to help the cloth stay in place.

Trim excess cloth where required

Ensure there is adequate cloth beyond the end of the imitation residuum.

Twist and invert the nylon stockinette over the fibreglass cloth

Ensure the sock is twisted at least 180 degrees, so it does not pull the first layer away from the PVC bag.

Do not add excessive twists, this could form ridges in the lamination.

Secure to the bottom of the lamination as shown and trim off excess nylon.

Apply a vacuum line below the end of the lamination

Pull a PVC bag over the entire lamination, beyond the vacuum line point.

Tie the end of the bag off using another piece of PVC bag.

Apply vacuum and prepare PVC bag for resin pour

Clip the end of the PVC bag and apply a vacuum through the line added prior.

Add a spacer ring to the free end of the PVC bag to prevent the bag from sticking.

Gently apply heat to assist the bag in shrinking to the lamination shape. This gentle heat will ensure a smooth finish.

Pour the resin into the top of the lamination

With the vacuum still applied, the resin will flow into the lamination.

Gently guide the resin down the model.

Take care not to stretch or pull the bag. Doing so may split the bag, and the process will be required to be repeated.

String out excess resin

Using cotton string, gently move resin into areas that are not filled and remove it from accumulating in areas.

Set the laminated inner socket into the vertical fabrication jig

Once the resin has cured, remove the external PVC bag and discard.

Remove the excess resin dam that may have formed at the distal end of the lamination.

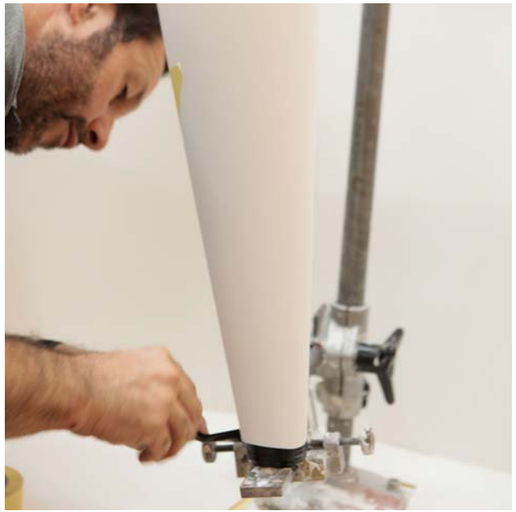
Lightly sand the surface of the lamination to aid the adhesion of the foam core.

Remount the lamination into the vertical fabrication jig. The relative position should match the interim socket setting.

Prepare Lamination Collar for foaming

Replace the Masking Ring onto the Lamination Collar, ensure the seal is seated correctly in the grooves as shown above.

To aid bonding to the Lamination Collar, an M5 Bold (#10 or #12 size) can be glued into the hex recess as shown. While not mandatory, this can help add reinforcement to the foam accessory core in the following steps.



Create the accessory model

Use a large piece of gloss cardboard or clear plastic to create the mould for the foam fill process.

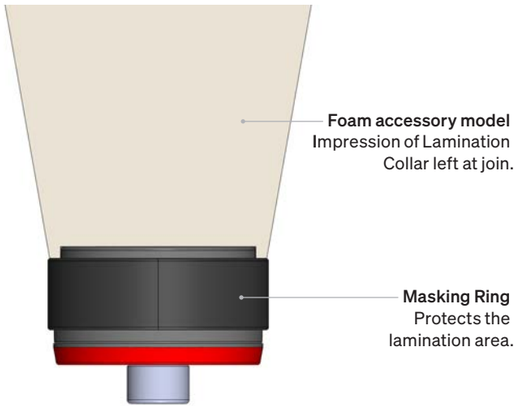
Wrap this tightly around the Lamination Collar and minimise the diameter to reduce the amount of shaping required.

Secure using tape to the Masking Ring to minimise the risk of spilling.

Fill the accessory model blank

Use a recommended expanding foam to create the accessory model.

Carefully fill the accessory model form and leave to set as per the manufacturers recommendations.



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Stage 3
Shaping the accessory model

Remove excess foam

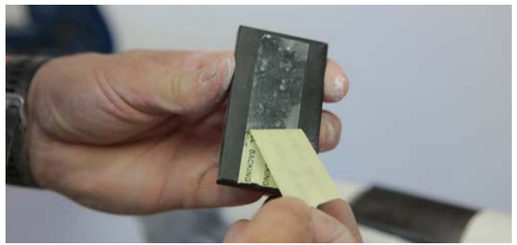
Once the foam has cured, remove the card mould.

Use a rasp to remove the excess foam and begin to shape the accessory model.

Shape accessory model and add material if required

The Masking Ring, which protects the lamination area from foam, can be removed from the Lamination Collar before shaping.

Continue to shape the model accordingly.



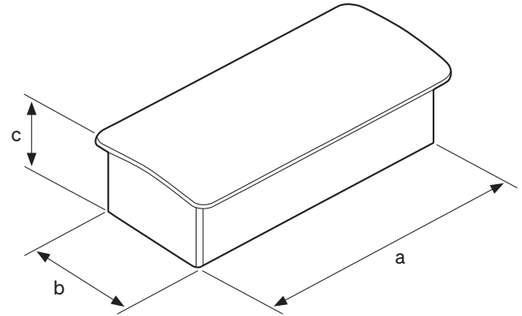
Position and mount the battery Lamination Dummies

Position the battery Lamination Dummies away from the Power Switch. Each dummy represents one cell.

Use the dummies to create a large, flat area to which the batteries can be mounted using a removable adhesive (Velcro or similar).

Mark the perimeter and carve a slot into the accessory model, minimising sharp edges where possible.

Adhere two Lamination Dummies together using double-sided tape if mounting the batteries in the same position.

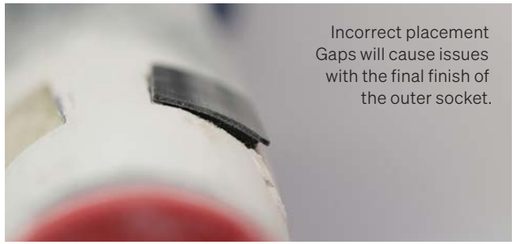


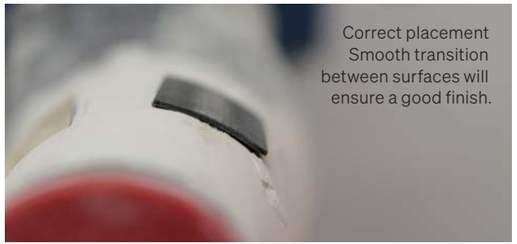
	POWER SWITCH	LAMINATION DUMMY
Length A (body)	51.5 mm	51 mm
Width B (body)	21 mm	20.5 mm
Height C (overall)	10.5 mm	15.5 mm

Position the Power Switch

Use the Lamination Dummy to approximate a position for the Power Switch - note the size difference between the Power Switch and the Lamination Dummy. This is because the depth of the Lamination Dummy is greater than the final depth of the Power Switch.

- Do not place the Power Switch in a location that could be easily caught.
- Ensure the patient has easy access to the power button.
- Consider if the prosthesis will have other accessories mounted inside the outer socket.





Mount the Power Switch Lamination Dummy

Carve out the accessory model to fit the thinner section Lamination Dummy for the Power Switch.

Avoid uneven edges, aiming to match the curve of the dummy with the curve of the accessory model.

Mount the switch's body so the lip is proud, as shown. This will help produce a definitive area to cut later.

Finishing the accessory model

Use progressively fine sandpaper to give the accessory model a smooth finish.

Check for low spots or areas that could collapse during vacuum.

Remove the Masking Ring and clear any excess filler on the lamination area.

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Stage 4
Final lamination

Prepare the Lamination Collar

Mount the accessory model into a vice in preparation for lamination.

Gently tighten the lamination bolt with an 8mm or 5/16 inch hex key to secure the seals.

Apply a small bead of putty and lubricant to the bolt head to aid with removal after lamination.

Mount the Lamination Dummies

Place the Lamination Dummies in place.

Pull over a thin stocking. This will help hold the Lamination Dummies in place and aid the application of the PVC bag.

Add a vacuum line at the base to pull the PVC bag to the accessory model.

Apply PVC bag

Pull a PVC bag over the accessory model.

Take care around sharp areas, including battery Lamination Dummies, as shown.

Apply a vacuum to bring the bag down to shape. Next, heat the bag gently using a heat gun to assist the bag in stretching over sharp areas and shrink to the model shape.

Prepare the PVC bag

Using PVC tape, create the termination of the lamination area around the Lamination Collar. This should be as low as possible, but consider that resin should not go inside the PVC bag.

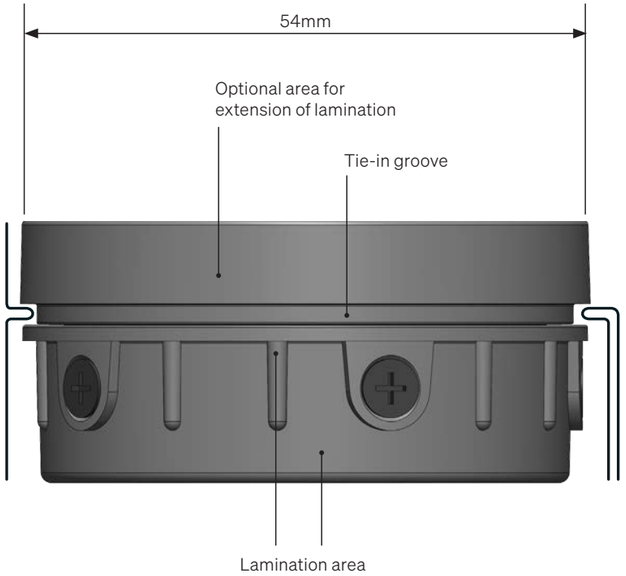
Trim the stocking and PVC tape using a sharp scalpel.

Seal this section using tape as shown. Pull this tight to minimise resin seepage.

Apply the first lamination layer

Pull a nylon stockinette halfway over the model.

Tie off the bag below the model and support the opposing end using a hanging clip as shown.



Method 1

Method 2

Choose a termination finish

Adding a layer of fibreglass to the wrist area will add strength to the connection while keeping weight down.

TASKA recommends laminating through the entire collar section (**method 1**). This will maximise the strength and simplify the finishing but will increase the finished diameter of the collar.

It may also be possible to reflex the laminate at the tie-in groove (**method 2**). This will achieve a smaller diameter collar finish but may be difficult to achieve a clean termination.

Add support to the wrist

Adding a layer of fibreglass to the wrist area will add strength to the connection while keeping weight down.

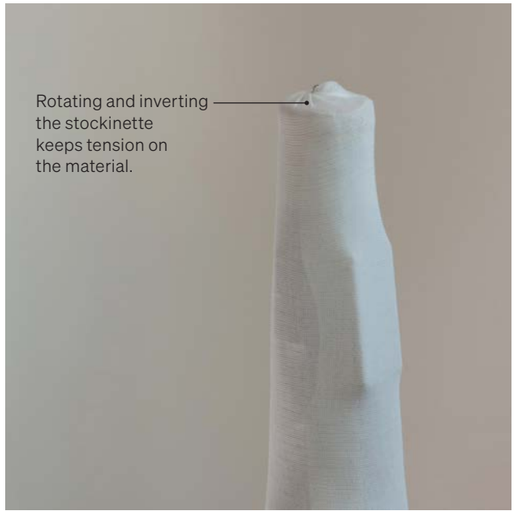
The method shown for the remainder of the manual is **method 1 - continuous layer secured through tie-in groove.**

Apply fibreglass cloth

Use a single layer of fibreglass to give the outer socket structure.

Spray adhesive will help keep the cloth attached as subsequent layers are added.

The cloth should be tied into the tie-in groove using a thin cotton string to aid the mechanical connection. Ensure there is no excessive bulk from the knot.



Invert the nylon stockinette and double back over the lamination

The second layer of nylon will assist the resin flow through the fibreglass cloth and help hold it to the accessory model during the lamination process.

Rotate the stockinette greater than 180 degrees and pull down below the model's base. Tie off using a piece of tape.

Apply reinforcements around tight areas

Use a single layer of fibreglass to reinforce the areas that may cause bridging (ie. sharp corners around the battery Lamination Dummies).

Use another nylon stockinette with a knot at one end to create a medium between the layers.

Cover the lamination in a PVC bag

Tie the bag off below the vacuum line using another piece of PVC.

Clip the top end of the bag using a clamp and apply a vacuum.

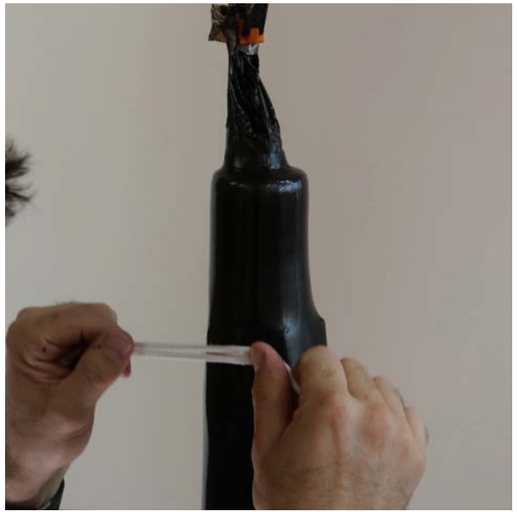
Remove any creases and use a heat gun to pull the bag to the final position.

This will create the external finish, so care must be taken at this step.

Apply the resin

Pour the resin into the top of the PVC bag.

Ensure air is not drawn through by clipping the bag as shown and allowing the resin to flow freely under the vacuum pressure.



String and finish the model

Once the resin has flowed through the composite, reduce damming areas by stringing the resin through.

Minimising the fill will result in a stronger and lighter final prosthesis.

Once completed, tie the reservoir off using a piece of cotton.

Tape the top edge of the model to help minimise the flow of resin and leave to cure.

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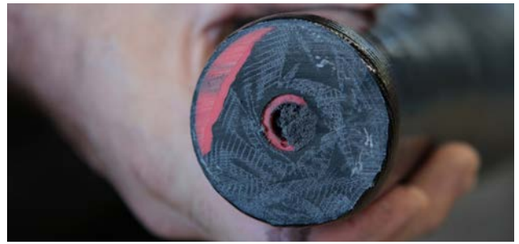
Stage 5
Finishing

Remove the retention bolt

Grind off the excess resin above the Lamination Collar as shown to expose the bolt head.

Remove the putty to allow access to the bolt head.

Use an 8mm or 5/16” hex key to remove the bolt.



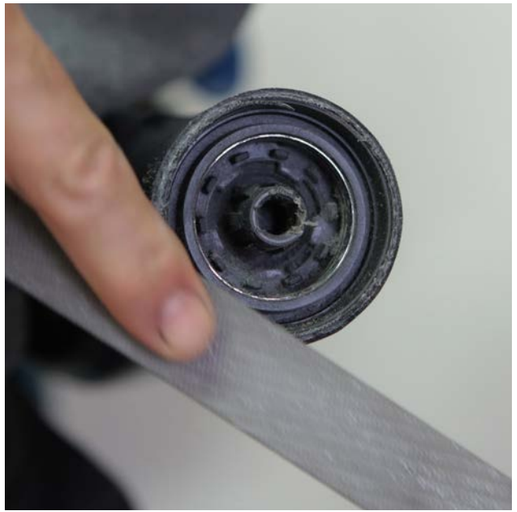
Remove Lamination Cap

Continue to remove excess resin until the red cap is exposed, as shown.

Clean up the edges to prepare for cap removal.

Carefully remove the cap to expose the Masking Plug.

The Masking Plug can now be removed.



Finish Lamination Collar

Using progressively finer tools, remove the excess material around the Lamination Collar until the plastic creates the final finish.

Separate inner socket and remove lamination core.

Use a marker to create a guide on the trim line.

Carefully cut out the two halves using a reciprocating saw, allowing the material to trim back.

Remove the plaster core, inner socket and the accessory model.

Clean up trim lines as required.

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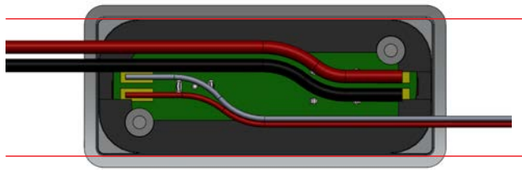
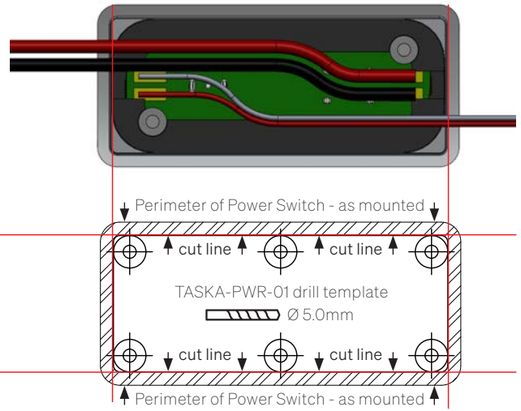
Stage 6
Installing components

Apply Power Switch drill template

Orientate the outer socket so the Power Switch emboss is visible and apply the drill template to the outside.

Place the Power Switch drill template so the perimeter edge follows the emboss edge created by the Power Switch Lamination Dummy.





The drill template indicates the maximum opening the Power Switch requires. If in doubt, cut inboard and test the fit before carefully removing more material.

Cut out Power Switch opening

Create a centre for each drill point using a 2.5mm drill and complete the hole using a 5mm drill.

Begin inboard of the cut perimeter and cut between the holes drilled using a reciprocating saw.

Use the Power Switch to test fit the hole.

Do not cut to the edge of the embossed area!

Prepare Lamination Collar for Coaxial Plug

With the accessory model removed from the outer socket, carefully remove the rubber retention ring from the Coaxial Plug as shown.

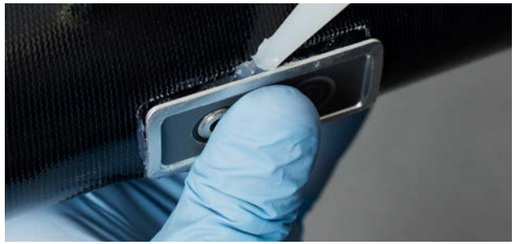
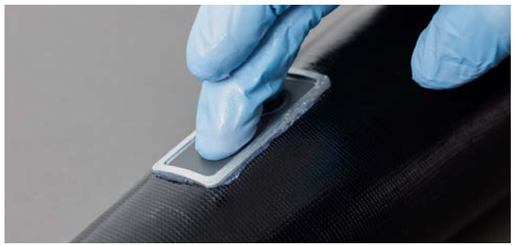
Using a clean wipe and isopropyl alcohol, remove any remnants of the lamination or accessory model.

Install Power Switch

Clean the perimeter of the opening to remove any oils or debris.

Apply a thick layer of silicone adhesive around the perimeter of the Power Switch as shown. Excess silicone will be removed later.

Thread the Coaxial Plug connection through the wrist as shown.

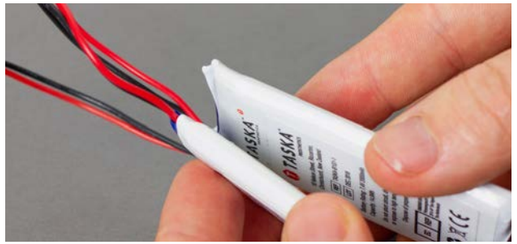

Install Power Switch

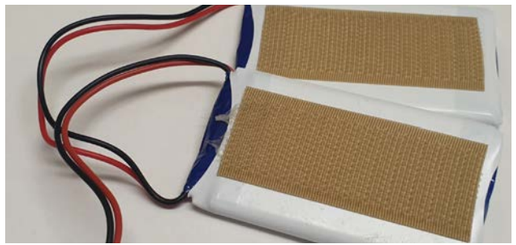
Thread the battery plug through the opening and lower the Power Switch into place.

Apply more silicone sealant as required to ensure a good bond.

Press the Power Switch down as shown to extrude excess silicone out.

Using a damp wipe, clean off the excess silicone. Allow the adhesive to set before attaching other components.



Adhere batteries into position

If a double-height battery is required, adhere the batteries together using a piece of double-sided tape.

Apply a piece of hook and loop velcro to the backside of the battery, taking note of the wire positions.

* If the batteries are mounted separately, securely fasten both cells using velcro as shown.

Installing the battery

Remove the peel layer on the velcro and place it onto the flat area inside the outer shell.

Check the battery will not move during operation.

Install Coaxial Plug

Remove the retaining nut on the backside of the Coaxial Plug.

Connect the Power Switch lead into the appropriate position on the Coaxial Plug.

Once the remaining components are fitted, re-install the Coaxial Plug with the Coaxial Plug Installation Tool.

Conclusion

After the outer shell is complete, the next steps may include:

- Creating the inner socket and suspension system
- Installing and setting up electrodes
- Adding donning features (vacuum ports etc.).

Further reading list:

Appropriate Use Guidelines

- Defining limits of the wrist and immersion depths.

Lamination Collar Installation Guide

- Installation and wiring of the Coaxial Plug.

Seal Ring Installation Guide

- For attaching a TASKA Seal Ring to the TASKA HandGen2 to create the waterproof wrist connection.

User Guide

- Maintenance instructions and general precautions for using the Seal Rings and Lamination Collar.