



User guidelines

User guidelines for the use of Revolution-ZERO products for veterinary applications



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Summary

- Revolution-ZERO textiles can replace single-use textiles in most veterinary settings and practices where there is access to washing facilities and an autoclave.
- The Revolution-ZERO range encompasses reusable surgical gowns, operating room drapes, masks, hats, incontinence products, warm-up jackets, uniforms, accessories, specialist low temperature cleaning chemistry and chemical free surface solutions.
- Revolution-ZERO products are designed, manufactured and distributed in accordance with ISO13485, Medical Device Quality Management systems standards including compliance with the EN13795 standards required for operating room and related environment performance.
- Revolution-ZERO continues to develop and supply best in class effective, economic and sustainable solutions that enhance resilience and minimise environmental impact. We work closely with university collaborators and clinicians across animal and human healthcare. Partnerships, feedback and collaborative development activities are welcomed.
- For further veterinary specific content please [visit the Revolution-ZERO website](#)
- Please [visit this page for instructions on preparation of gowns, drapes and packaging](#)

2. When do we use reusable medical textiles?



All aseptic surgery within the operating theatre, other than those with a defined and limited surgical approach, in which 'field' sterility may be appropriate.

Reusables are best not to be utilised for procedures where there is a high likelihood of permanent damage to the textiles such as exposure to solvents, cutting for improved surgical site access or burning.

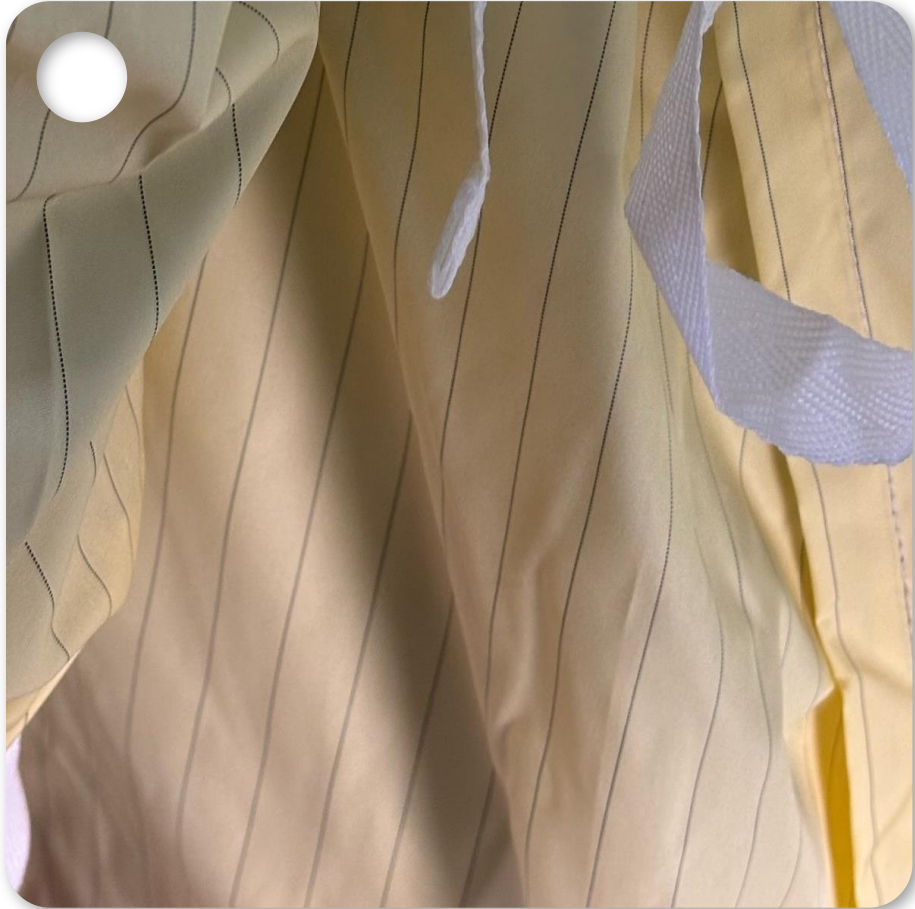
Revolution-ZERO textiles may be used in surgery utilising diode lasers (ophthalmic surgery) which target pigmented skin and are unlikely to cause damage. However, reusables are less appropriate for most laser surgeries, due to the risk of damage.

Many veterinary organisations exclude the use of reusables when there is potential exposure to cytotoxic agents.

If there is a highly infectious agent present reusables are not excluded for use however care must be taken to protect staff and to ensure there is complete decontamination of the textiles and equipment used to process them. In the case of exposure to a highly infectious agent an organisation may opt for utilising disposable alternatives.

3. What products are available from Revolution-ZERO?





Gowns/Aprons

- 99% Polyester, 1% Carbon Fiber
- High tech 99% polyester microfibre that is designed for wearability, durability and recyclability
- 1% carbon yarn in the construction for anti-static, some microbial resistance and non-linting properties
- Negligible microfibre shedding due to long-chain polyester filament composition
- Easy fit features such as popper neck adjustment

The Standard Performance Surgical Gown is certified to be reprocessed and used at least 75 times.



Max. water temperature
90°C



Do not bleach or
use oxidants



Mild drying
process



Do not iron



Do not dry clean
Do not use solvents
to remove stains

Gowns/Aprons



Surgical Gowns – standard protection designed to be sterilised and to be utilised for most veterinary surgical procedures

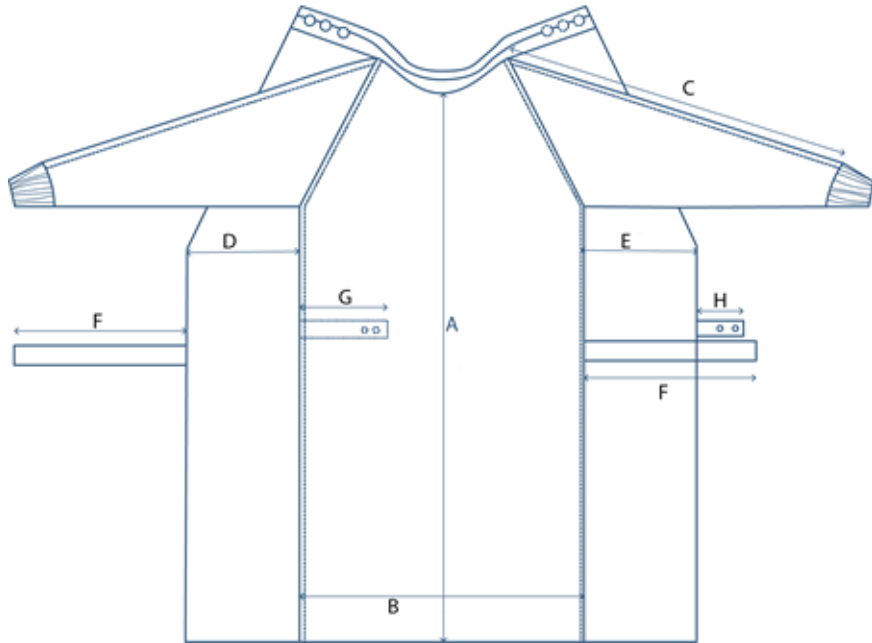


Isolation Gowns – lightweight non-sterile gown for minor procedures



Aprons – limited area non-sterile barrier protection for minor procedures

Surgical Gowns



	Description	S	M	L	XL	XXL
A	Neck to hem	110	116	121	126	131
B	Side seam to side seam	55	60	64	68	72
C	Shoulder to wrist	70	79	82	86	86
D	Side seam to edge right back panel	55.5	58.5	61.5	63.5	63.5
E	Side seam to edge left back panel	39.5	41.5	43.5	45.5	45.5
F	Waist tie length	60	60	60	60	60
G	Internal popper tie length	19	19	19	19	19
H	External popper tie length	8	8	8	8	8

Measurements in cm



Drapes

- 99% Polyester, 1% Carbon Fiber
- High tech 99% polyester microfibre that is designed for drapability, durability and recyclability
- 1% carbon yarn in the construction for anti-static, some microbial resistance and non-linting properties.
- Negligible microfibre shedding or linting due to long-chain polyester filament composition. No de-linting required.
- Engineered absorbency to minimise surgical field fluid contamination

Revolution-ZERO surgical drapes are certified to be reprocessed and used at least 75 times.



Max. water temperature
90°C



Do not bleach or
use oxidants



Mild drying
process








Do not iron



Do not dry clean
Do not use solvents
to remove stains

Drapes

	Description (cm)	External	Fenestration	Absorbent Area
	<p>Major Surgery Fenestrated Drapes Large overall area drapes for surgeries where a wide sterile field is required. Absorbent area around fenestration.</p>	120 x 120 cm	4 x 4 cm 4 x 6 cm 6 x 8 cm 8 x 8 cm 8 x 15 cm	30 x 40 cm
	<p>Spay/Small Fenestrated Drape A smaller overall area drape for smaller animal and more minor surgeries. Absorbent area around fenestration.</p>	50 x 80 cm	4 x 6 cm	25 x 30 cm
	<p>Surgical Wraps/Table/Instrument Covers/Plain Drapes Plain drape with no absorbency, made from fluid resistant material. Multi-purpose wrap that can be used as packaging to create larger surgical packs or as set covers for covering tables and surgical instruments. Can also be used for creating multiple drape surgical fields.</p>	60 x 90 cm 80 x 80 cm 100 x 100 cm 120 x 120 cm 140 x 140 cm	n/a	n/a
	<p>Trolley Drape Full size trolley drape with large absorbent field.</p>	150 x 200 cm	n/a	45 x 90 cm
	<p>Absorbent Drapes and Incodrapes Full area absorbent fields. Absorbent drapes have no water repellent backing whereas Incodrapes have a full field water repellent backing. Both can be used in sterile and non-sterile environments.</p>	58 x 72 cm 72 x 115 cm 115 x 143 cm	n/a	58 x 72 cm 72 x 115 cm 115 x 143 cm



Tex-Protect

- Low environmental impact high performance reusable packaging system
 - Coloured ties to indicate gown sizes for easy recognition
 - Validated to maintain sterility for at least 6 months, even in uncontrolled clinical storage conditions
 - Saves >99% of current packaging waste (sterile indicator tape is exception)
 - Can be utilised for gowns, drapes, surgical instruments and single-use items
 - Co-developed with the NHS, University of Southampton and University College London
-

Packaging System (Tex-Protect)



Internal packaging with gown inside



Large pack packaging tie – pink, 240cm to create packs



Gown packaging ties



External packaging (with loop to lock packaging tie through)



Recyclable paper tag

Tex-Protect is a 1 to 2-layer reusable packaging system for gowns, drapes and surgical instruments that replaces both single-use pack-aging for storage and autoclave pouches. The external layer has been validated to maintain sterility for at least 6 months.

This patent-pending packaging system consists of internal and external packaging components integrating virtual pouches to facilitate rapid use, a recyclable paper tag and coloured ties (matching gown neck colours to easily identify size).

As per normal practice for surgical instruments, sterile indicators must be visible externally and can be linked to the packaging ties.

Variations:

As the external layer has been validated to maintain sterility there is considerable flexibility for different use cases.

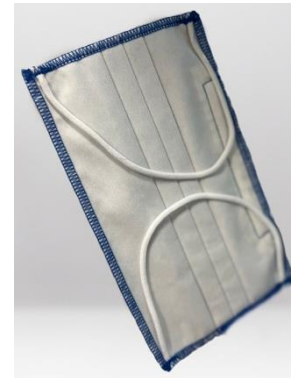
Most organisations utilise a two-layer system due to convention and established practice. There is potential to utilise the packaging as a single-layer for gowns, drapes and instruments. We will happily work with any partner wishing to explore utilising the single-layer option.

NHS practice for gowns has been to utilise the external pouch and our 80 x 80cm drape as an internal wrap.



Other products

Reusable Fluid Resistant Surgical Masks



-
- Co-developed with frontline NHS stakeholders during the coronavirus pandemic
 - Utilised for the world's first at scale rollout of a competent authority (MHRA) certified surgical mask in a hospital setting (Cornwall 2021)
-

The Revolution-ZERO Type IIR FRSM Masks are certified to be reprocessed and used at least 40 times.

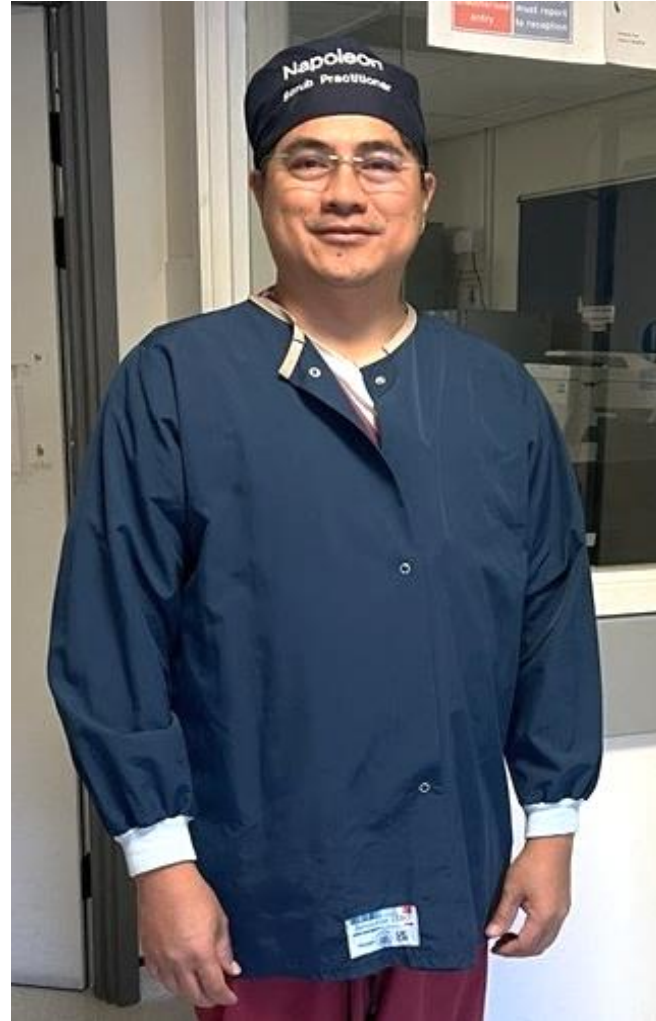
Reusable Hats



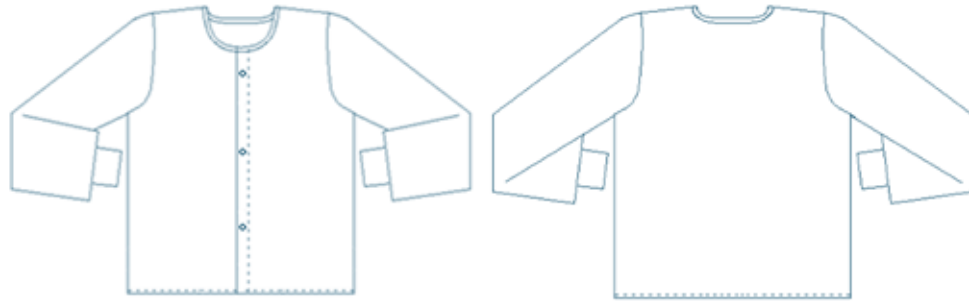
- Co-designed with Danish, Italian and UK textile designers, clinicians and scientists as part of an EU circular economy project
- Created to be two-size fits/configures for all with exemplary clinical performance

Unlike traditional polycotton and single-use OR hats these hats are exceptionally low linting minimising potential particulate contamination of the surgical field.

Reusable Warmup Jacket



Sizing and Features: Standard



- Unisex Standard Jacket suitable for use by healthcare personnels to minimise contamination in the operating theatre.
- Available in Navy Blue

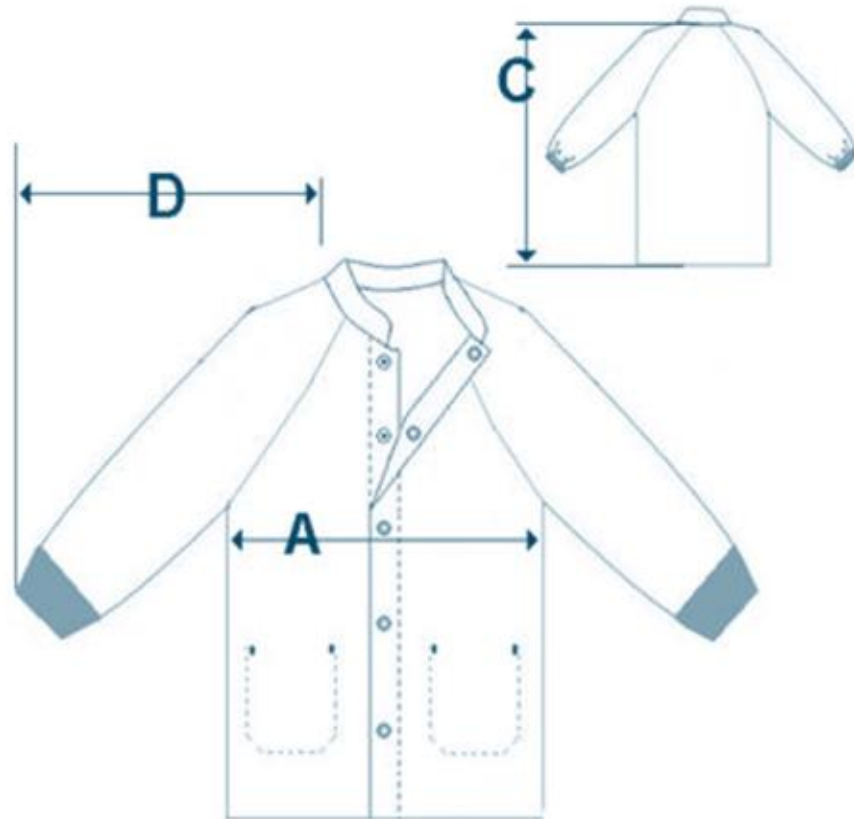
Tracking options:

- 1. RFID:** Used to track items, uses, stock numbers and environmental impact
- 2. Grid:** A textile grid stitched onto the garment used for marking usage number

Description (cm)	XS	S	M	L	XL	XXL	TOL
To fit chest size (inches)	34-36"	36-38"	38-40"	42-44"	46-48"	50-52"	
A Shoulder inc. binding	11.5	13	14.5	16	17	18	1.5
B Chest width	60	63	66	69	73	77	1.5
C Hem width	60	63	66	69	73	77	1.5
D Armhole straight	24	24.5	25.5	26	28.5	31	1.5
E Sleeve overarm exc cuff	51.5	53	54.5	56	58	60	1.5
F Sleeve underarm exc cuff	43.5	45	46.5	48	50	52	1.5
G Cuff length	5	5	5	5	5	5	1
H Back neck width	18	18	18	18	19	20	1.5
I Length – SNP to hem	77	78	79	80	82.5	85	1.5
J Distance between poppers 5cm form top	23	23	23	23	23	23	1

Measurements in cm

Sizing and Features: Thermal



	Description (cm)	XS	S	M	L	XL	XXL	3XL	4XL
A	½ Chest circumference	55	59	63	67	71	75	79	83
B	Body length	69	72	75	78	81	82	83	84
C	Sleeve length (without cuff)	68	71	74	77	80	81.5	83	84.5

Measurements in cm

- Unisex Thermal Jacket suitable for use by healthcare personnels to minimise contamination in the operating theatre.
- Front fastening with press buttons, U-neck, long sleeves with knitted cuffs
- 2 front pockets
- Available in Light Blue and Navy Blue

Tracking options:

1. **RFID:** Used to track items, uses, stock numbers and environmental impact
2. **Grid:** A textile grid stitched onto the garment used for marking usage number



ZERO-DECON

High performance laundry chemistry for
all temperature ranges –
optimised for low temperature washing with
environmental and economic savings



4. What are instructions for using Revolution-ZERO textiles?

Number of reprocessing cycles

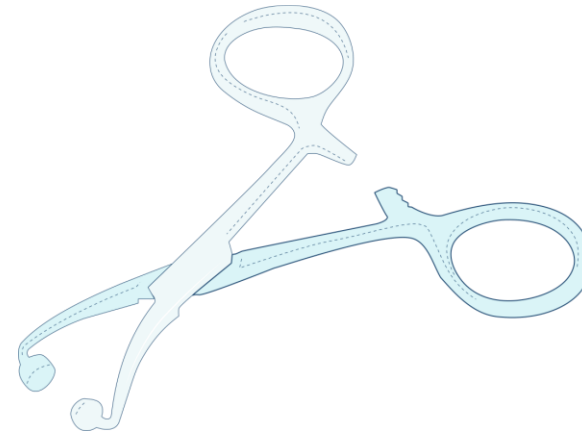
- The Revolution-ZERO gowns and drapes can be reprocessed 75 times (and the fabric packaging and ties 100 times).
- Please track uses by marking with permanent ink on the gown's grid patch with an indelible marker after each use and before reprocessing (see photo right).
- Using dated sterile indicator tape is recommended in order to track both effective sterilisation and shelf-life
- Surgical textiles should look visibly clean and not damaged. Reusable surgical textiles may naturally dis-colour or develop some staining over the product life cycle. To more closely inspect, hold textiles with a light source on the other side to make it easy to inspect for holes or other damage.
- Retire from use if the fabrics are obviously damaged or degraded, or when 75 reprocessing cycles have been performed (see 8. End of life and recycling).



Storage

- Store sterile items on metal or plastic shelving between at controlled temperatures (between 4-30 Celsius), at lower than 65% humidity avoiding exposure to excess UV light. For optimal protection store in a closed cupboard.
- Do not use wooden shelves due to the potential to harbour Aspergillus species.
- The external packaging alone has been validated to maintain protective sterility of items for up to 6 months (see above)

5. Can we use towel clamps or incise drapes with Revolution-ZERO drapes?



- Sharp towel clamps will leave holes in the drape which reduces the drape's integrity for future use. The fenestrated drapes are designed to remain in place, with the use of ball-tipped towel clamps for drape-to-drape (but not patient-to-drape) fitting.
- Sticky incise drapes for orthopaedic or ophthalmologic surgery over the fenestrations can be used.
- It needs to be noted that incise drapes may leave a glue residue on the reusable textile, which may be challenging to completely remove during laundry/processing process. This will not affect the sterility of the textiles (only the aesthetics).

6. How are Revolution-ZERO textiles reprocessed?



Facilities

- Wash all textiles before use – they will arrive clean off the production line and require washing to remove any particulates and threads from manufacture.
- Clean and dirty laundry should ideally be handled in separate areas (such as a different rooms or a partitioned room. Do not process in active clinical treatment or publicly accessible areas.
- Folding and packing of reusable needs to take place in a clean and decontaminated area such as an operating table after hours or where surgical instruments are packed.
- Where limited space is available, and clean and dirty laundry is processed in the same area, then a surface decontamination protocol needs to be implemented between washing/ drying and clean textile processing.
- Laundry areas need to have appropriate personal protection and hand sanitising facilities available
- Consider use of movable, cleanable trolleys or transporting contaminated textiles in laundry bags.
- It is recommended to wash smaller textile items such as facemasks, ties and scrub hats in mesh bags to avoid risk of entanglement during the wash process.
- Reusable surgical textiles need to be washed separately from bedding and other contaminated textiles. In the ideal scenario, a dedicated scrubs and surgical textiles washing machine is used. If this is not possible rinse between bedding and surgical textile loads. Use of laundry bags can aid in separation.
- These laundry guidelines are equally applicable for the washing of non-sterile surgical fabrics such as isolation gowns, staff warming jackets and absorbent towels.



Pre-Wash

- If there is blood or organic / hair contamination, wash on a cold rinse cycle before the main wash or pre-soak in cold water.
- If the machine has previously been used for non-surgical fabrics, please run a cold rinse cycle, and wipe out the washing machine drum prior to washing surgical textiles.

Wash programmes

- By default wash textiles using a wash cycle at 60 degrees Celsius or utilise a validated thermal decontamination cycles.
- For packaging that has not been contaminated and will be sterilised a cold wash cycle is recommended.
- In addition to the packaging use case a variety of low temperature highly effective wash programmes/protocols can be utilised though please discuss or refer to the Revolution-ZERO technical team for support and guidance on best and validated practice.

Chemicals

- Use a general detergent formulation only.
- In general, do not use bleach, oxidising agents or fabric softeners.
- If you need guidance or for specific issues please contact the Revolution-ZERO team.

After-washing

- Sanitise hands before touching clean textiles.
- Work wear needs to be clean.
- Dry the gowns in a tumble dryer. Choose a cycle with air temperature exceeding 65 degrees Celsius for a minimum of 15 minutes.
- Handle the textiles in a clean room, with robust hand hygiene in place.

- Inspect and remove any obvious contaminants such as paper, lint or hair/fur before packing. De-linting is generally not required for the Revolution-ZERO reusable surgical gowns or drapes due to the technical qualities of the fabrics.
- Package the textiles as soon as feasible after laundry/drying to protect against potential airborne contaminants/particulates.
- Textiles can be packed using the reusable RevZero packaging system, reusable metal containers or single-use packets.
- DO NOT IRON or dry clean

Sterilisation/Autoclave Instructions

- Refer to your autoclave manufacturer instructions for appropriate cycles. Drying cycles are ideal however if not give the textiles suitable time to acclimatise outside the autoclave after processing (see below). The autoclave must be validated for medical device or textile sterilisation. Ensure the service record is up to date.
- Place packets in the autoclave with space between the sides of the machines and between packets if more than one is autoclaved. For larger autoclaves packets can be stacked in a crisscross pattern.
- Use 134°C for a minimum of three minutes (121°C for 15 min autoclave cycle is also acceptable with these fabrics).
- Use appropriate indicators to confirm success of sterilisation cycle.
- Check that there is no damage to packets after sterilisation. There have been occasional reports of materials melting which indicates a faulty autoclave requiring immediate service.
- Post-sterilisation allow textiles to dry to room temperature for 30–60 minutes to ensure there is no residual moisture present. Dry in a clean, controlled environment away from dirty materials.
- Revolution-ZERO textiles can be run through Ethylene Oxide cycles; however, a steam autoclave is more efficient. If using the packaging for items which are suitable for low-temperature sterilisation only then utilise Ethylene Oxide.

7. How do we fold and pack the Revolution-ZERO textiles?

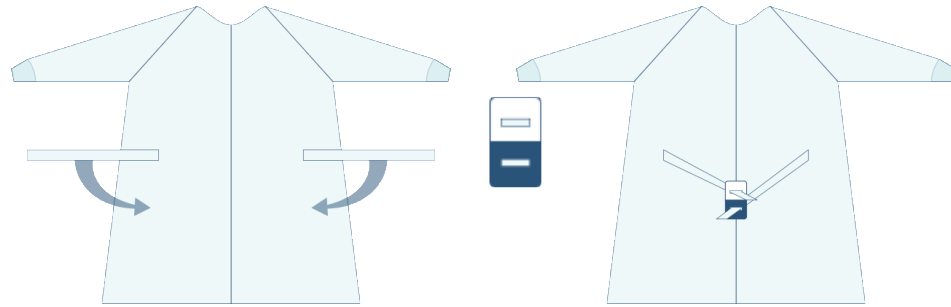




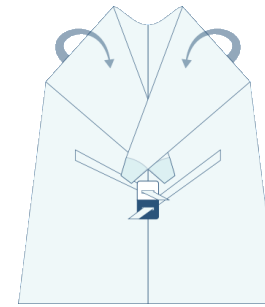
Folding Revolution-ZERO gowns

The most accessible guidance is available on YouTube: <https://youtu.be/1eBD-26a34A> 

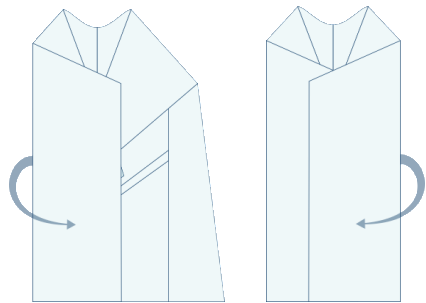
Step 1. Clean the surface prior to laying out the gown. Lay the gown flat on the table with the outside facing up and any fabric away from the floor. Pull the ties to the centre, threading them through the gown tag pulling approximately 4 cm through.



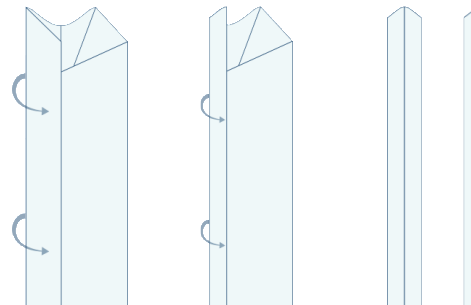
Step 2. Bring the sleeves together so that the cuffs meet in the centre and the tag is underneath the sleeves.



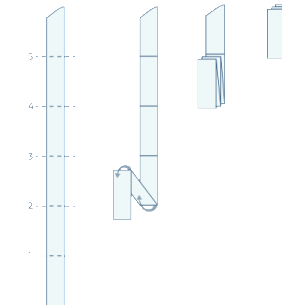
Step 3. Fold each side once lengthwise at the seam towards the centre, covering the sleeves and ties.



Step 4. Fold each side twice to the centre lengthwise. Fold one side over the other lengthwise.



Step 5. Starting from the bottom of the gown, concertina-fold in three layers, leaving the neck area on top.

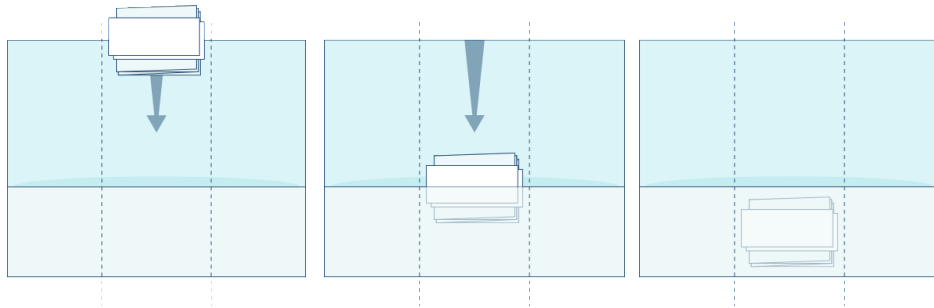




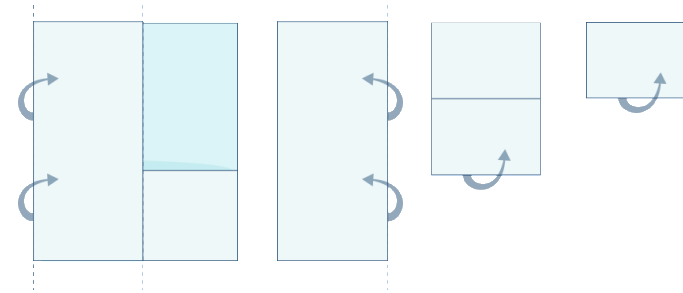
Packaging textiles using the RevZero double pouch packaging system (standard)

The double pouch guidance is available on YouTube: <https://youtu.be/85VNC4uHqkc>

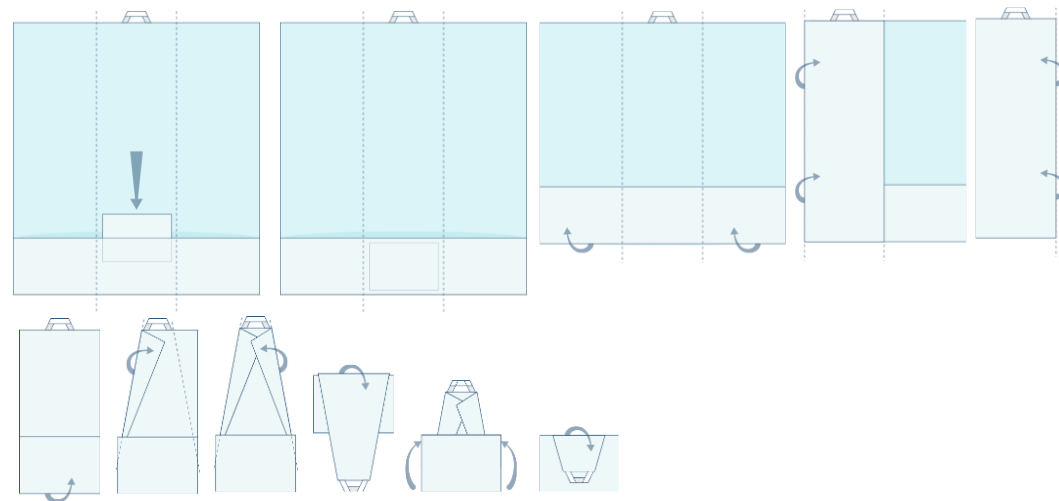
Step 1. Take out 2 TEX-protect packaging pouches. Place any hand towels on the gown (if used).



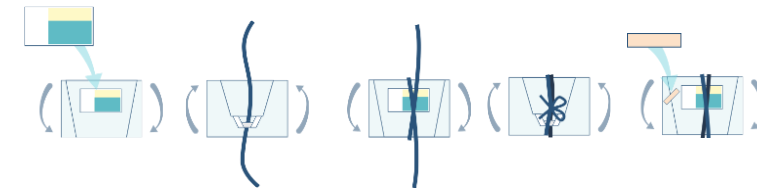
Step 2. Internal Packaging: Insert the gown with towels into the first packaging pouch. Fold the sides to the centre and roll tightly.



Step 3. External Packaging: Place the rolled internal pack into the external packaging pouch, ensure that the open side is inserted first, ensuring it creates a convoluted pathway for optimising shelf life. Fold flaps to the centre and roll forward, keeping the pack tight.



Step 4. Tie using a single bow and label the gown with the size, date and relevant identification information using sterilisation tape.



Step 5. Put the packaged gown through the autoclave as per instructions above and store in a controlled environment.

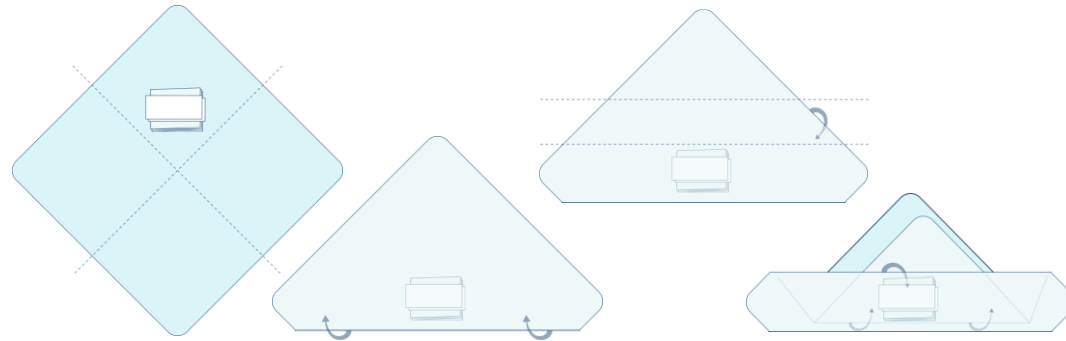


Packaging textiles using the RevZero drape and external pouch packaging system

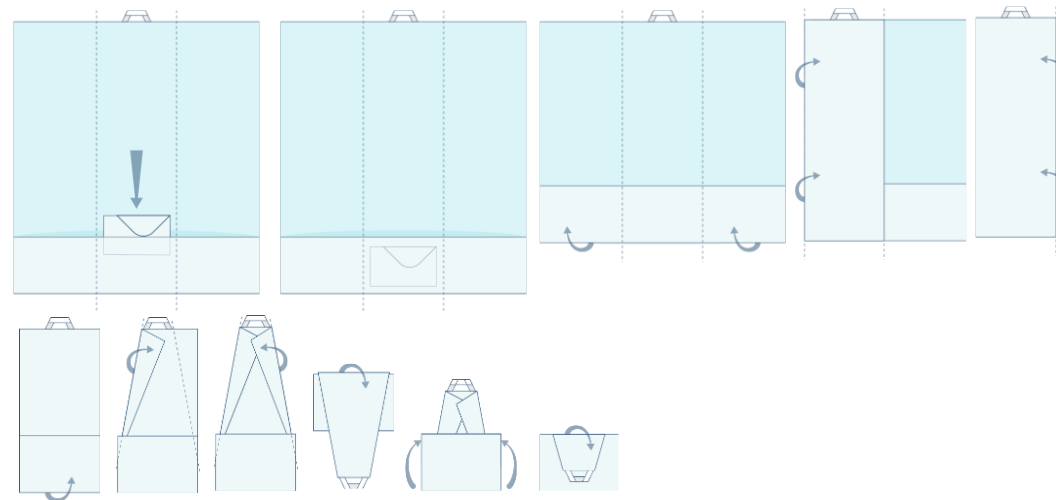
Drape and external pouch technique can be viewed here: <https://youtu.be/4JXsFpNKJVO>



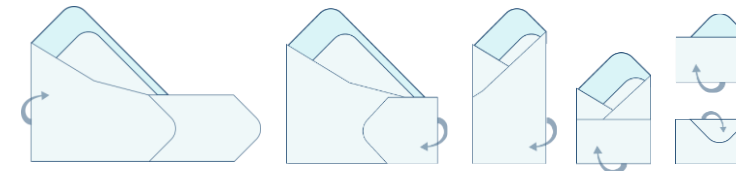
Step 1. Take



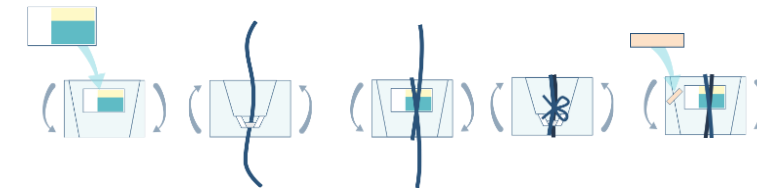
Step 3. External Packaging: Place the rolled internal pack into the external packaging pouch, ensure that the open side is inserted first, ensuring it creates a convoluted pathway for optimising shelf life. Fold flaps to the centre and roll forward, keeping the pack tight.



Step 2. Internal.



Step 4. Tie using a single bow and label the gown with the size, date and relevant identification information using sterilisation tape.

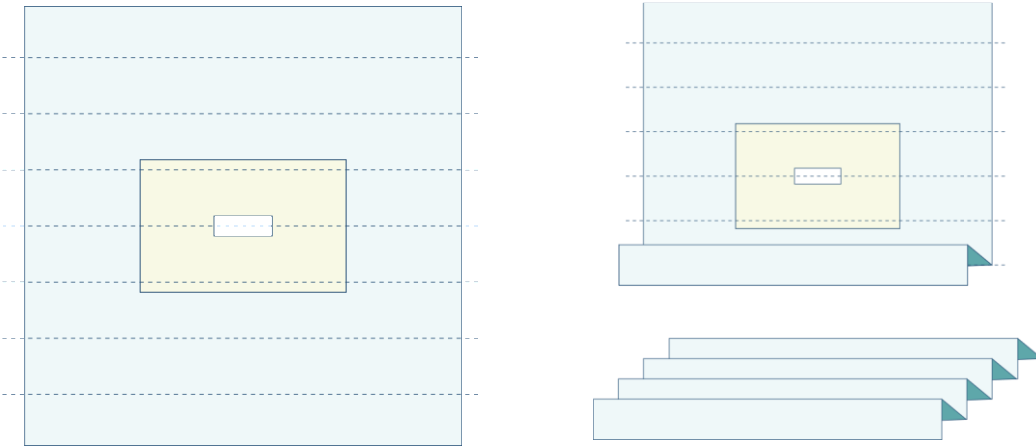


Step 5. Put the packaged gown through the autoclave as per instructions above and store in a controlled environment.

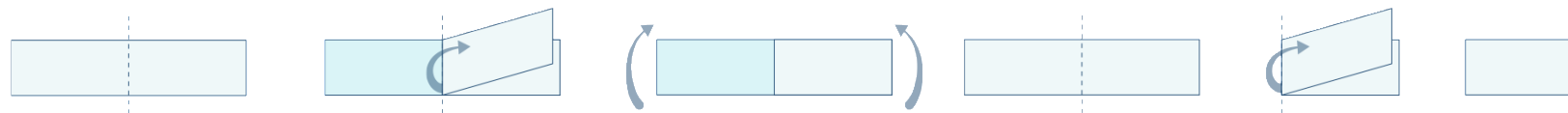


Folding A Fenestrated Drape

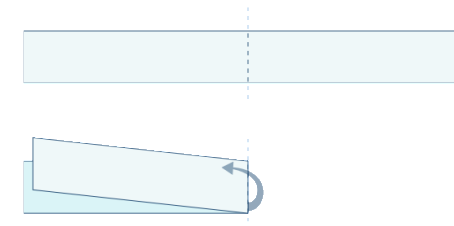
Step 1. Take the fenestrated drape and lie it patient facing down. Fold as shown in the diagram completing a concertina pattern from one side to the far edge. This helps keep the fenestration covered in material during all handling until final use.



Step 3. Take each of the longer edges and fold them back to meet the fold created at Step 2. This will produce a compact rectangle ready for placing into a wrapping drape or pouch for sterilisation.



Step 2. Fold the lengthwise folded drape in half



Note: There are several different methods for folding and unpacking fenestrated drapes. We prefer this method as it more fully protects the fenestrated area during handling through to final use.

8. End-of-life and recycling



- After 75 uses, Revolution-ZERO drapes and gowns have reached the end of their fully tested and compliant use within a sterile surgical setting. They may however remain suitable for other uses such as non-sterile patient limb covers (when moving into theatres), isolation gowns or general covers.
- At end-of-life, Revolution-ZERO accepts all of their reusable surgical textiles back for repurposing into textiles such as barrier curtains, uniforms or packaging. When repurposing is not possible, textiles will be mechanically recycled into other in theatre products like trays and dishes.
- Clinics must ensure that the textiles are **washed and clean** (not sterile) before return.
- Please use the parcel boxes the textiles were delivered in or specific return procedures (such as utilisation of clear bags) that your organisation uses for collection at end of life.

If you have any questions on return please contact
Tom Dawson, Founder of Revolution-ZERO on
tom.dawson@revolution-zero.com



User guidelines 2026
