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# 1. Safety Precautions

**WARNING:** Forming fabric installation involves heavy rolls, rotating equipment, and confined spaces. All personnel must wear appropriate PPE: safety helmet, steel-toe boots, cut-resistant gloves, and safety glasses. Lock-out/tag-out (LOTO) procedures must be in place for all drive systems before any personnel enter the machine frame. This is non-negotiable.

- All installation personnel must review this guide and sign the installation safety checklist before commencing work.
- A minimum of 4 trained personnel is required for installation; 6 recommended for machines wider than 6 meters.
- Designate one experienced supervisor as the installation coordinator – all commands during fabric pulling and tensioning come from this person only.
- Ensure communication: radios or standardized hand signals must be confirmed by return signal before any movement begins.
- Crane or hoist capacity must be verified against fabric package weight (see packing slip) with  $\geq 50\%$  safety margin.
- Emergency stop procedures must be reviewed with all personnel before work begins. Identify the location of all E-stop buttons.
- Confined space protocol: personnel inside the machine frame must use the buddy system with check-in every 5 minutes.

## 2. Pre-Installation Preparation

Proper preparation is the single biggest factor determining installation success and subsequent fabric life. The following steps must be completed at least 4 hours before the scheduled installation start time.

### 2.1 Tools & Equipment

Item	Quantity	Purpose
Fabric lifting beam (spreader bar)	1	Evenly supports fabric roll during crane lifts
Slings / lifting straps (rated capacity)	2–4	Secure fabric roll to lifting beam
Torque wrench (0–100 Nm)	1	Tension roll bearing adjustment
Tension meter (mechanical or digital)	1	Verify fabric tension at each tensioning stage
Caliper gauge (digital, 0.01 mm resolution)	1	Pre- and post-installation thickness measurement
Alignment laser / optical level	1	Roll parallelism verification

Item	Quantity	Purpose
Fabric guide paddles (non-metallic)	2	Manual fabric positioning during threading
Seam wire insertion tool	2	Pintle wire insertion for pin-seam fabrics
Clean lint-free rags	50+	Clean all fabric-contact surfaces
Protective floor sheeting (plastic/cardboard)	As needed	Protect fabric during floor rolling operations

## 2.2 Fabric Package Inspection

- Inspect shipping crate for damage – photograph any visible impact or moisture damage before opening.
- Verify fabric ID tag against purchase order: model number, dimensions (width × length), seam type, and running direction arrow must all match the machine requirements.
- Measure fabric width at 3 points (operator side, center, drive side) and verify against ordered width ± 5 mm tolerance.
- Check all seam components are included: pintle wires (2× – one for installation, one spare), seam lubricant, and any custom installation tooling.
- Store fabric in the machine hall for a minimum of 24 hours before installation to allow temperature and humidity acclimatization. This reduces dimensional change during the critical first hours of run-in.

## 3. Machine Inspection Checklist

Every item must be completed before fabric entry into the machine. Check off each item – do NOT proceed until all items pass. This discipline prevents the most common causes of premature fabric failure.

#	Inspection Item	Pass/ Fail	Remarks / Action if Fail
1	All rolls rotate freely by hand – no tight spots or roughness	<input type="checkbox"/>	Replace bearings if any roughness detected
2	Ceramic foil surfaces: no cracks, chips, or excessive wear grooves	<input type="checkbox"/>	Replace any foils with >2 mm wear depth
3	Vacuum box covers: flat, no sharp edges; slots/blinds clean	<input type="checkbox"/>	Resurface or replace worn covers
4	All roll surfaces clean – no rust, stock build-up, or adhesive	<input type="checkbox"/>	Solvent clean only; NEVER use metal scrapers
5	Guide roll alignment: all rolls parallel ±0.2 mm/meter of face	<input type="checkbox"/>	Use optical alignment system to verify
6	Stretcher (tension) roll: moves freely through full range	<input type="checkbox"/>	Lubricate guides; verify position indicator works
7	Guide system: paddle/sensor operational; guide roll moves	<input type="checkbox"/>	Test with manual trigger before

#	Inspection Item	Pass/ Fail	Remarks / Action if Fail
	smoothly		fabric entry
8	Showers operational: correct pressure, fan pattern, no clogged nozzles	☒	Clean or replace nozzles as needed
9	Machine frame: no loose bolts, sharp edges, or protruding parts	☒	File down or cover any sharp edges
10	Drive system LOTO confirmed – zero energy state verified and signed off	☒	Signed LOTO procedure in the installation file

## 4. Fabric Handling & Unpacking

CAUTION: Forming fabrics are precision-engineered products. The monofilament weave can be permanently damaged by improper handling. Folds, kinks, and point loads are the most common causes of installation-related fabric failure. A single sharp fold can create a permanent crease line that will mark the sheet for the entire fabric life.

- NEVER fold the fabric. Folding creates permanent crease lines that will mark the sheet.
- Always use a spreader bar with slings positioned at the 1/4 and 3/4 points of the roll width for balanced lifting.
- When rolling the fabric on the floor, ensure the floor is clean and covered with protective sheeting (cardboard or plastic film).
- NEVER walk on the fabric. If personnel access across the fabric is needed, use a clean plywood bridge.
- Keep the fabric away from welding operations, grinding sparks, and any heat sources – monofilaments melt at ~255 °C.
- Remove the outer packaging only when the fabric is positioned at the machine – minimize exposure to shop dust.
- Identify the running direction arrow and top/bottom markings (blue tracer thread = sheet side). Confirm with all team members.
- Do NOT remove any internal wrapping or seam protection until the procedure explicitly calls for it.

## 5. Installation Procedure – Step by Step

This procedure assumes a standard cantilever-type forming section with the fabric pulled in from the tending (operator) side. Adapt for your specific machine configuration – if uncertain, consult PAPTEX application engineering before proceeding.

### Step 1 – Position the Fabric Roll

- Place the fabric roll on a pay-off stand or unwind carriage on the tending side, aligned with the machine centerline.
- Verify the running direction arrow points in the correct machine direction (fabric runs FROM the breast roll TOWARD the couch roll).
- Ensure the roll can rotate freely with controlled tension – the brake mechanism should prevent free-wheeling but not resist the pull.

## Step 2 – Thread the Pulling Rope

- Attach a 10–12 mm synthetic pulling rope (nylon or polyester, NEVER wire rope) to the fabric lead edge using the factory-installed pulling eyes or a fabric gripping clamp with protective jaws.
- Route the rope through the machine following the normal fabric run path. At each roll, ensure the rope will pull the fabric onto the roll surface – not under it.
- The rope must exit the machine on the drive side and attach to a controlled winch or manual pulling team.

## Step 3 – Pull-In

- Slowly winch the fabric into the machine at a steady speed of 2–4 m/min. NEVER exceed 5 m/min.
- Station one person at each critical roll to guide the fabric and watch for snags or contact with stationary parts.
- The installation coordinator calls "STOP" if any person signals a problem. Radio silence during pulling means continue – no news is good news.
- As the fabric approaches each roll nip, reduce speed to 1 m/min to confirm correct feed.
- Continue pulling until the fabric lead edge reaches the seam joining point (typically at the breast roll or couch roll return run).

## Step 4 – Seam the Fabric

- Align the two fabric ends precisely at the seam position. Use the provided seam alignment tools to match the seam loops.
- For pin seams: insert the pintle wire slowly, using the dedicated insertion tool. Apply seam lubricant (provided) to the pintle before insertion.
- Verify every seam loop is engaged by running a thin feeler gauge (0.05 mm) along the entire seam line. Any unengaged loops will be detected as gaps.
- Insert the retaining clip or bend back the pintle end as specified by the fabric construction.
- NEVER use excessive force – if the pintle binds, back it out 10 cm and re-insert. Binding usually indicates misaligned seam loops.

## Step 5 – Initial Tension

- Apply initial tension of 2.0–3.0 kN/m. The fabric should be taut but not tight – it will appear slightly slack

between rolls.

- Jog the machine at minimum speed (10–15 mpm) for 5 minutes while observing fabric tracking on all rolls.
- If tracking is stable at crawl speed, proceed to the tensioning schedule below.

## 6. Tensioning & Run-In Schedule

The run-in period is critical for fabric conditioning. The fabric weave and seam must settle under controlled, progressively increasing loads before full production tension is applied. Rushing this process is the leading cause of seam failure in the first week of operation.

Phase	Elapsed Time	Tension (kN/m)	Speed (mpm)	Actions Required
Initial	0–2 hours	3.0	15–30	Observe tracking; check seam integrity every 15 minutes
Stage 1	2–4 hours	4.5	50% of production	Begin shower operation if applicable
Stage 2	4–8 hours	6.0	70% of production	Begin stock on wire if production is ready
Stage 3	8–24 hours	Operating (6.5–8.0)	90% of production	Monitor caliper at edges vs. center; compare to baseline
Full Production	24+ hours	Operating	100%	Normal operation; continue daily Level 1 inspections

Tension is measured at the mid-point of the longest unsupported fabric span. Take measurements at three cross-machine positions (operator side, center, drive side) and average. Target cross-machine tension variation:  $\leq \pm 0.3$  kN/m. Higher variation indicates roll misalignment or uneven fabric width.

## 7. Guiding System Setup

- Paddle Guide: Set paddle pressure to 0.2–0.4 bar. Excessive pressure accelerates edge wear and can cause edge curl. The paddle should contact the fabric with light pressure – just enough to follow the edge position.
- Optical/Ultrasonic Sensor: Non-contact sensor tracks fabric edge position. Preferred for high-speed machines (>800 mpm) – zero edge wear. Position sensor 50–75 mm from the nominal fabric edge.
- Guide Roll Stroke: Ensure the guide roll has  $\pm 30$  mm minimum stroke from the neutral position. Verify mechanical stops are set correctly to prevent over-travel.
- Response Speed: The guide system should correct a 10 mm edge deviation within 3–5 seconds. Slower response indicates hydraulic or pneumatic issues that must be addressed.

## 8. Post-Installation Inspection

Complete this inspection 8 hours after reaching Stage 2 tension, and again at 24 hours (full production). Record

all results in the fabric life file for trend analysis.

Item	Method	Target	8h Result	24h Result
Caliper – OS edge	Digital caliper, 5-pt avg	Within 5% of nominal	☒	☒
Caliper – Center	Digital caliper, 5-pt avg	Within 5% of nominal	☒	☒
Caliper – DS edge	Digital caliper, 5-pt avg	Within 5% of nominal	☒	☒
Tension – OS / C / DS	Tension meter	Within $\pm 0.3$ kN/m across width	☒	☒
Seam integrity	Visual + feeler gauge	No open loops, no visible gaps	☒	☒
Edge condition	Visual inspection	No fraying; PU seal intact both sides	☒	☒
Tracking stability	Observe 5 minutes	Edge position stable within $\pm 5$ mm	☒	☒

## 9. Troubleshooting – Common Installation Issues

Issue	Probable Cause	Corrective Action
Fabric wanders to one side	Rolls not parallel; guide system malfunction	Re-align rolls using optical system; verify guide system operation
Seam opens intermittently	Insufficient tension during run-in phase	Increase tension to minimum operating value; inspect pintle wire for damage
Edge curl or fold-over	Guide paddle pressure too high; roll misalignment	Reduce paddle pressure to 0.2 bar; verify all roll alignments
Center wrinkle at low speed	Tension too low for fabric width	Increase tension in 0.5 kN/m increments until wrinkle disappears
Noise/vibration at breast roll	Fabric too tight; foil-to-fabric contact issue	Check tension at operating spec upper limit; verify foil mounting height