

INSTALLATION AND START-UP OF FORMING FABRICS

INTRODUCTION

This Technical Report is offered as a guide to the papermaker for information on installation of equipment supplied by Weavexx and installation and start-up of Weavexx fabrics. This report has been divided into four sections for easy reference. It is suggested that the pertinent section be read in its entirety before any operation is begun and the specified required steps be followed in sequence.

Weavexx engineers have assisted with the installation, start-up and subsequent troubleshooting on all paper machines running Weavexx fabrics and hydrofoils. This experience has produced the knowledge that certain minimum conditions are necessary for the success and certain other conditions will optimize the performance of Weavexx fabrics. Assembled in this report are procedures and recommendations for preparing your machine for optimum performance using Weavexx products.

Continuing development and research at the Weavexx plants worldwide and actual experience in this area by Weavexx engineers will result in better procedures. To optimize your new fabric foil system, Weavexx engineers will be available with the most recent up-to-date developments and data to assist at the initial Weavexx fabric or Weavexx equipment installation.

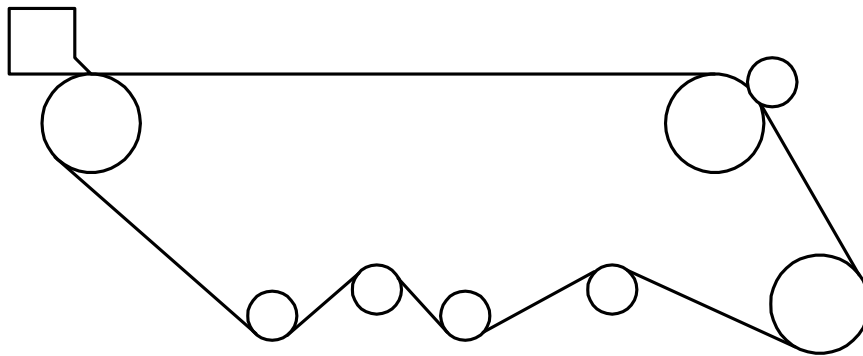


TABLE OF CONTENTS

Pre-installation	Page
Observe Old Fabric	3
Shutdown and Cleanup	3
Machine Component Inspection.....	3
Machine Component Level and Alignment	4
Installation	
Machine Cleanup	6
Install Equipment.....	6
Align Positive Spreader Roll and Set Bow	6
Stringing the Fabric	7
Reassembling the Machine	7
Start-up	
Pre-Start-up.....	7
Start-up	7
Getting the Sheet On	8
Post Start-up	8
Shutdown	
Procedure.....	9

PRE-INSTALLATION

Introduction

During a pre-installation shutdown, it is essential that a thorough check of the fourdrinier and its components be performed. If adverse factors are found, corrections should be made at the same time other shutdown work is performed. Fabrics are flexible and will react adversely to machine misalignment. The degree of initial success is directly proportional to the thoroughness of the inspection and alignment of the fourdrinier. There is no short cut to this procedure.

Observe Old Fabric

Existing conditions will usually indicate such things as misalignment, fiber buildup, wear, etc.

1. Fabric Running Condition

- 1.1 A guide roll (either hand guide or automatic), which is constantly guiding the fabric toward one side, may be compensating for misalignment of other equipment (rolls or flat boxes).
- 1.2 Ridges may indicate leaking doctors, plugged showers, misalignment or concave areas on rolls.
- 1.3 Puckers or draw ripples indicate possible
 - ♦Misalignment (static or dynamic)
 - ♦Fiber buildup on rolls
 - ♦Uneven roll or foil blade surface
 - ♦Leaking trays

2. Fabric Appearance

- 2.1 Worn or filled streaks indicate - uneven spots on either stationary or rotating elements.
 - ♦Poor fitting doctors
 - ♦Plugged showers
 - ♦Nonuniform apron
 - ♦Rubbing deckles or cheeking pieces
- 2.2 Streaks indicate areas on the machine, which should be checked carefully at shutdown. Inspect the machine area corresponding to each streak around the complete loop after the wire has been cut off.

Shutdown and Cleanup

This portion of the procedure should be followed in the usual mill manner.

1. Make sure that your boil-out chemicals are compatible with Weavexx fabrics.
2. For cleaning Weavexx fabrics, consult your Weavexx Sales/Service Representatives.

Machine Component Inspection

1. Existing Foil Blade Inspection

Foil blades on hydrofoil and VACUFOIL units and the forming board strips should be thoroughly inspected for any condition, which might damage the fabric. Fabrics are sensitive to abrasion from rough surfaces.

- 1.1 Use a piece of emery cloth or a Carborundum stone to smooth any plastic foil blade surface imperfections, nicks or burrs. A small wood plane or a mill file will remove a feathered edge from the plastic blade.
- 1.2 For best performance, it is recommended that the sharp leading edge of all doctoring surfaces (forming board strips, hydrofoil and VACUFOIL blades, deflector blades, etc.) be dulled with a suitable file or plane. Care should be taken to remove just the sharpness from the leading edge.
- 1.3 In order to ensure that removal of hydrofoil blades on the run will not damage or mar fabrics, inspect the end of the T-bar polyethylene blade which will be positioned on the back side of the paper machine. Round off any sharp edges or nicks with a pocket knife, small wood plane or mill file.
- 1.4 Inspect all "hard-coat" or ceramic surfaces for burrs, nicks or chips. If any are found, remove this item immediately as it will cause damage to the fabric. These can be sometimes removed by a diamond stone or equivalent.

2. Other Components

Inspection of other components will not delay fabric installation.

- 2.1 In the case of a knock-down machine, inspection of other machine components can be made while they are out of the machine and in the aisle.
- 2.2 In case of a roll-out or cantilever machine, ample time for inspection is available while stringing the fabric.

Machine components to be inspected and conditions to check are:

- Roll surfaces - pits, grooves, humps or concave sections.
- Particular attention should be given to all driven rolls, especially a drilled bronze or stainless steel couch roll.

Machine Component Level and Alignment

It should be understood that although the procedure described below is necessary for the maximum life of a fabric, it does not guarantee alignment under operating conditions. In a few mills, the machines were aligned statically but misaligned dynamically. Worn bearings, loose keyways, undersized keys, loose journals and broken bolts are a few of the items which have been found to cause dynamic misalignment. This condition can be found by examining the draw of the fabric from roll to roll and can be corrected sometimes on the run. The problems caused by dynamic misalignment and their solution will be discussed in the "start-up" section of this report.

1. Roll Level

Level all rolls with a 12" shaft level. Allowable tolerances on roll levelness are .004"/ft. on high wrap rolls (breast roll, couch roll, wire return roll) and .008"/ft. on low wrap return rolls.

Give special attention to assure that tolerances are related to each other. (If the breast roll is .004"/ft. low on the back side, these rolls are outside tolerances: .008"/ft. difference, on a 180" face - 15" - would equal 1/8".)

2. Tape Machine Front and Back

Machine alignment is more critical with all forming fabrics. This is because fabrics are

flexible and will distort more readily to conform to any non-uniformity. It is not always possible to observe machine misalignment while a fabric is running. A small degree of misalignment can, however, cause short life with a fabric.

2.1 Tape the front side and back side while the wire is still on the machine. (Dynamic conditions of the machine are simulated when rolls, etc. are still under tension.)

2.2 A difference greater than 1/8" between front and back loop lengths indicates corrective action is required. Even if the front and back measure the same, compensating errors may exist. Therefore, each roll should be checked. Even new machines, optically aligned, can be misaligned due to reading errors; therefore, a double-check is not out of order.

2.2.1 Breast and couch roll misalignment is most critical. Breast roll centerline to couch centerline, front and back, should be checked and corrected to within 1/16" of each other.

2.2.2 Tape front and back between rolls, using the breast roll or couch roll centerline as a reference to align return rolls. Center the hand guide and automatic guide for this operation. Tolerance is 1/16" centerline-to-centerline.

(a) The fabric may be removed before checking the distance between return rolls as fabric tension will have only a slight effect on these low wrap rolls.

(b) To tape the return run on cantilevered and roll-out machines, it may be necessary to use plumb bobs; or, locate centerline on bottom of roll using machinist's centerhead and tape along the fabric run, as shown in the following illustration.

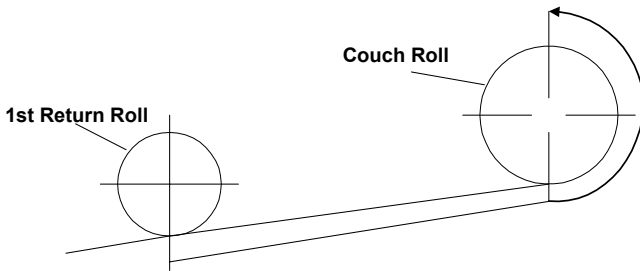


Figure 1

2.2.3 The stretch roll should be checked in its minimum and maximum positions. It has been found that fabrics have been damaged because of unequal travel of the front and back sides of the stretch rolls.

2.3 It is most desirable to have accurate measurements of the minimum and maximum running length. This is the best time to take them if the machine is in alignment and major changes in roll positions are not anticipated.

Obtaining a “stretch curve” (running length vs. position of stretch roll) is recommended. This can be done while obtaining minimum and maximum length by taking loop measurements at several positions of the stretch roll and measuring the position of the centerline of the stretch roll from some convenient reference point (usually the sole plate.) The graph of this information will permit the papermaker and Weavexx to know the running length of the fabric simply by measuring the location of the stretch roll.

A Typical Curve...

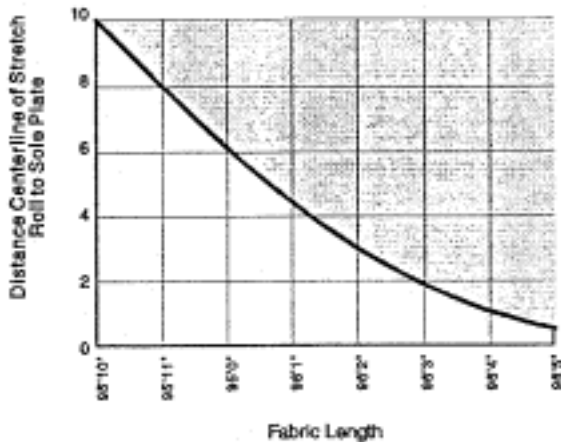


Figure 2

3. Align and Level Flat Boxes

3.1 Change or resurface covers if necessary. Smooth surfaces on plastic covers will produce excessive drag load.

3.2 Align boxes from the centerline of the breast roll, front and back side. DO NOT use the bottom slice lip for an alignment reference. (If boxes must be removed, scribe their location on the machine and re-level at reinstallation.)

3.3 Level boxes with a shaft level or a surveyor’s level. Level tolerance is .004”/ft.

NOTE: On some machines, the couch, a table roll, or a foil blade can be used to string the leveling line once these elements have been leveled.

3.4 Check flat box deckle mechanism to assure proper operation. “Bleeding” deckles can impart a guiding tendency to the fabric.

3.5 Make certain that the flat box cover pattern is such that any force exerted laterally is from the center toward the front and back edges. A pattern which exerts forces from the edges to the center can cause a fabric to ridge in the center.

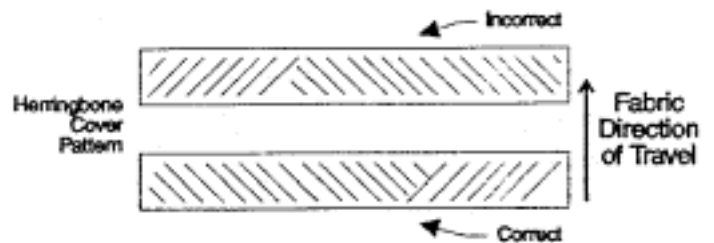


Figure 3

3.6 Some cover drilling patterns have produced a guiding tendency toward the front or back side. It is recommended that your Weavexx Technical Service Representative be consulted to determine whether or not this problem may exist.

4. A system of match-marking or doweling should be employed on all major components to ensure that the alignment can be duplicated if removal and reinstallation are required during any shutdown.

- 2.2 Adjust levelness and alignment of any table rolls and deflectors which are to remain on the machine.

INSTALLATION

Complete Machine Cleanup

Install Equipment

1. Align hydrofoil and VACUFOIL units with the breast roll according to the machine layout furnished by Weavexx.
 - 1.1 DO NOT use the bottom slice lip for an alignment reference.
 - 1.2 Block breast roll if it is free to turn.
 - 1.3 Scribe centerlines on the breast roll (front and back) with a center head and set the hydrofoil and VACUFOIL units, table rolls and deflectors down the table at the correct distance from the breast roll centerline.
 - 1.4 Tape from breast roll centerline to each element front and back. DO NOT tape from element to element.

NOTE: Alignment can be simplified by marking the tape at the exact distances shown on the Weavexx print and setting one side and then the other. This will also allow a quick recheck after the fabric has been installed.

2. **Level Hydrofoil and VACUFOIL Units.** This procedure is best accomplished with the use of a standard surveyor's level.
 - 2.1 If this instrument is not available, a satisfactory alternate is with the use of piano wire (or other similar material) strung tightly between the breast roll and couch roll.

It is recommended that 1/4" keystock be placed under the fabric at both ends and the foils raised until a 1/4" piece of keystock just slides between the fabric and the first and last blades on the unit.
 - 2.2 Make certain that each unit level is maintained when it is completely fastened down on the rail.

Align Positive Spreader Roll and Set Bow

(Used on a limited number of machines)

Spreader rolls are required ONLY for operation on a few specific monofilament applications including some twin wire machines. Installation should produce a 10° - 12° total wrap of the fabric on the roll (shower headers in this area must be lowered to maintain their effectiveness.)

1. On adjustable bowed rolls, set the bow at 1" to 1-1/4" per 100" of width.
2. Locate the spreader roll so that its centerline (CMD) corresponds to the center of the fabric. This is very important as an offset bowed roll will guide the fabric opposite to the direction of the offset.
3. Check parallelism of roll by running a loop around it and the couch roll or a return roll. The reference roll must have been determined to be square in the machine.
 - 3.1 Since the spreader roll has a bow, the loop must be taken over the brass collar at the ends of the bowed roll.
 - 3.2 The level of the roll can be checked most accurately with surveyor's level, making certain that the measuring rule is held on the top center of the brass collars.
4. Set the bow direction on the positive spreader roll so that the arrow on the shaft is parallel to the way the fabric would run if the positive spreader roll were not in place. The head of the arrow should point in the direction of travel (toward the breast roll.) One way this can be done on the machine is to run a string from the underside of the couch to the top of the wash roll and turn the roll until the arrow is parallel to the string.

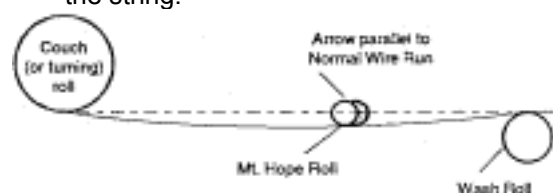


Figure 4

The spreader roll must be an inside roll when located in its preferred position between the couch and the wash roll and will have to be moved at each fabric change on a knock-down machine. (A convenient way of handling a spreader roll on a knock-down fourdrinier is to install brackets on the couch frame and hang the roll from the couch during a fabric change. An overhead crane can then be used to pick up the spreader roll from the bracket and replace it in its proper position.) Chisel mark the position of the bow on the mounting bracket and the roll shaft. Check these marks each time spreader roll is moved. The use of swing cap mountings from spreader rolls will facilitate taking the roll in and out of the brackets at each fabric change without having to make the brackets.

5. A second spreader roll has been recommended infrequently. This roll is usually located at approximately 1/2 of the distance between the last return roll and the breast roll and should be an outside roll. The bow is in the direction of travel (toward the breast roll) and the bow is set in the same manner as described above.
6. The manufacturers of spreader rolls recommend that they be greased daily when used in wet positions. These rolls should be added immediately to the "Daily Greasing Log."

Stringing the Fabric

1. Precautions
 - 1.1 Keep the fabric flat over all rolls. When installing the last roll, which places tension on the fabric, give special attention to ensure that the fabric is perfectly flat over its entire loop length.
 - 1.2 Keep the fabric centered on all rolls during installation.

If the fabric is not centered when tension is applied, diagonal wrinkles may result.
 - 1.3 Keep fabric alignment stripes straight. The alignment stripes, consisting of black bands across the fabric, should be kept parallel to all of the cross-machine elements. The risk of wrinkling and narrowing the fabric and losing drainage is much higher when the stripes are bowed or cocked.

Reassembling the Machine

It is, of course, necessary to ensure that all components removed from their operating position during fabric installation are replaced in their proper aligned positions.

START-UP

Introduction

Included in this section are checklists for pre-start-up, start-up and post-start-up procedures.

Pre-start-up

1. Clear aisles, catwalks and machine frames of any object which may be hosed or dropped onto the fabric.
2. Check all roll nips with a light to make sure they are free of foreign objects.
3. Recheck breast roll to couch roll centerline dimensions, front and back sides.
4. Make sure the guide unit is functioning properly.
 - 4.1 Air guide - check to see that the roll correctly answers the movement of the paddle.
 - 4.2 Mechanical guide - make sure all linkage is connected properly and fastened tightly.
5. Station a man at the guide roll. In case there is a malfunction, he can correct it by hand before the fabric runs ashore.
6. If these procedures have been properly followed, there should be no puckers. However, if puckers are present, station men on front and back sides ahead of the breast roll and ahead of the couch or wire turning roll (4 men) to pull the fabric flat and keep any puckers from going around these high wrap rolls. Puckers are not harmful and will flatten out; but, if they are allowed to go around a high wrap roll, ridges or wrinkles may be formed.

Start-up

1. Put the fabric on crawl speed.

2. Turn on all showers and trim squirts. Make sure they are operating correctly and are set at the correct angle.
3. Allow a few revolutions for the fabric to “square” itself on the machine.
4. Set fabric tension as recommended by your Weavexx Technical Service Representative for your specific fabric design and machine operations.

When the fabric is guiding well and there are no wrinkles or diagonal draw puckers, then paper is ready to be made. However, if there are guiding problems, wrinkles, puckers, etc., immediately shut down the fourdrinier and make the necessary adjustments to correct the problem. Follow shutdown procedure.

Puckers will result from machine misalignment. These will be diagonal and will appear to be “running” toward the front or back side of the machine.) These will become more severe with time. If the puckers are diagonal, shut down the fourdrinier and re-tape the machine or make alignment changes as required.

Getting the Sheet On

Experience has shown that the following procedure is best for Weavexx fabrics and the following sequence of events should be made standard practice:

1. Fabric on crawl speed, showers operating, etc.
2. While the headbox level builds up, turn ON vacuum to couch roll and turn OFF vacuum to flat boxes.
3. When the furnish flows out of the slice and onto the fabric, increase the fourdrinier speed to normal start-up speed for that grade of paper to be produced.
4. Turn ON vacuum to flat boxes. Adjust vacuum levels as required.
 - 4.1 Flat boxes are the most common source of guiding problems on the fourdrinier. If the fabric guides well without stock but moves to the front or back when the vacuum is applied, stop the fourdrinier and check:
 - a. Alignment of flat boxes to breast roll centerline.

- b. Air leakage around deckle seals (fabric will move to side opposite leakage).
- c. Surface condition. (Wear patterns in the surface usually follow a diagonal row of holes. If the wear gets deep enough, the cover can have a tremendous effect on guiding.)

4.2 If for any reason the fourdrinier is stopped, shut off all trim squirts and showers (high pressure needle will puncture the fabric if left on with the fabric stopped.) Follow shutdown procedure.

5. Once the sheet is over the couch, turn on fourdrinier shake, if applicable. A Weavexx system can eliminate or considerably reduce the need for shake operation.

Post Start-up

1. Immediate Checks:

- 1.1 Tension on fabric

Measure at outgoing side of stretch roll with tensometer instrument. (Tension requirement is dependent upon machine operating conditions and varies between 10 and 30 PLI for different machines and types of fabrics.)

- 1.2 Guiding

- 1.3 Foil blade contact and drainage

- 1.4 Rolls turning

- 1.5 Puckers, ripples

Dynamic misalignment of one or more rolls will cause diagonal puckers or ripples to paper in the draw. They will appear to “run” toward the right side of the fabric loop. If this condition is not corrected, ridges (a sharp crease) or wrinkles (fabric folded over on itself) will result.

Locate the suspect roll(s), shut down the machine (follow shutdown procedures and make the necessary corrections to roll alignment.

If misalignment cannot be found, statically move roll 1/8” in such a manner that the loop

length is lengthened on the side where the puckers form (or 1/8" in such a manner that the loop length is shortened on the side toward which the puckers move.) Restart the machine and examine draws. Make additional corrections as required.

2. Periodic Checks

- 2.1 Buildup on rolls - hose off.
- 2.2 Buildup on foil blades - remove blade, wipe clean and reinstall while the machine is running.
- 2.3 Tray leakage - correct.
- 2.4 Doctor leaks - correct.
- 2.5 Verify and set tension at recommended operating level.

SUMMARY

In our continuing effort to provide benefits to our customer, Weavexx makes every effort to assist you in any way to better optimize fabric and foil operations on your machine.

See your Weavexx Sales and Service Representative or you may call direct to Marketing Services in Wake Forest, North Carolina (1-800-WEAVEXX) for technical service assistance or other technical reports.

SHUTDOWN

Procedure

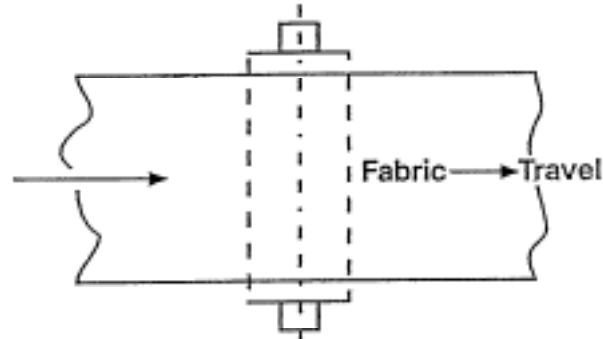
1. Raise dandy and lumpbreaker.
2. Turn of shake.
3. Run out stock and water flow in normal manner.
4. Turn off trim squirts.
5. Turn off showers.
6. Stop machine.

Examples of Guide Roll Operation

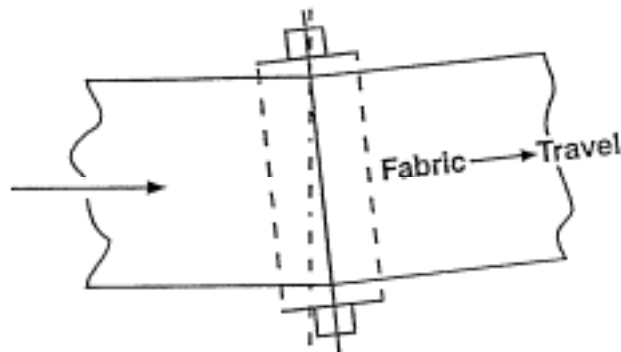
Fabric Traveling to Right



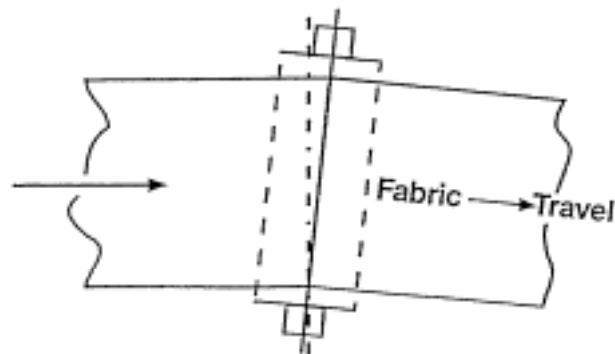
Degree of Travel
of Guide Roll



Roll 90° to Travel—Fabric Guides Straight

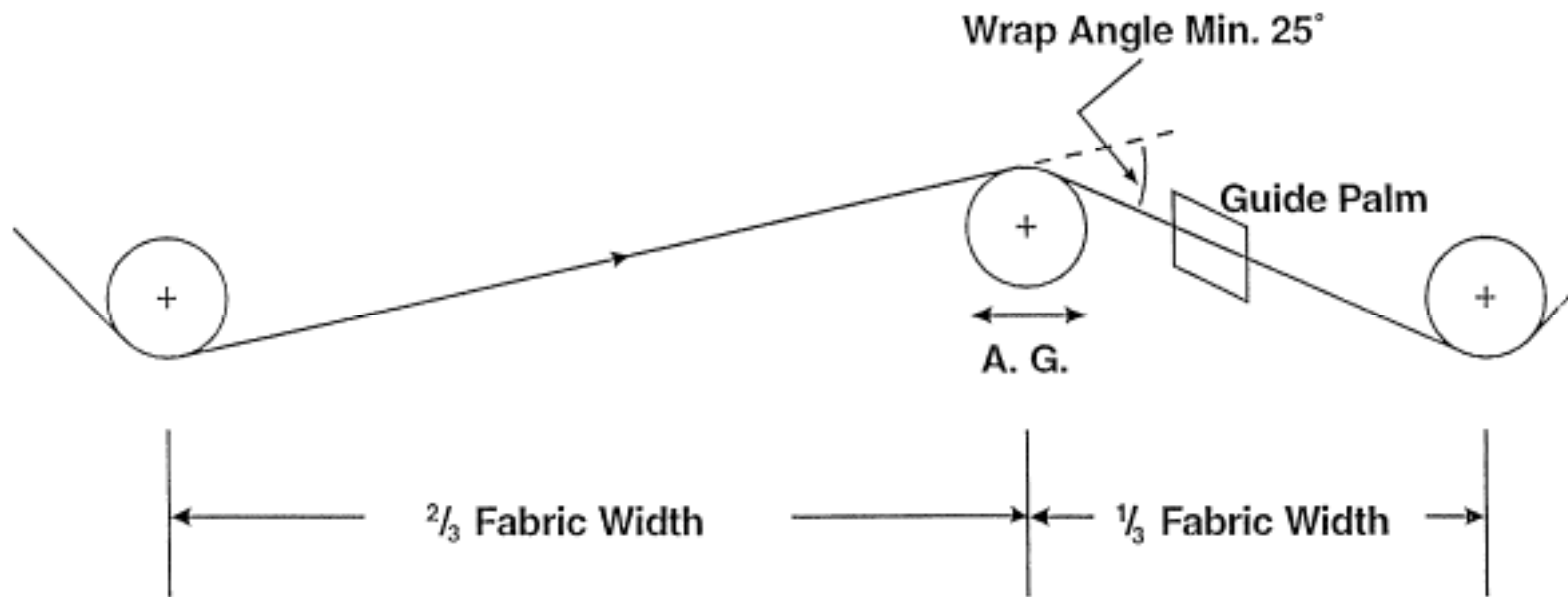


Roll 96° to Travel—Fabric Guides to Back

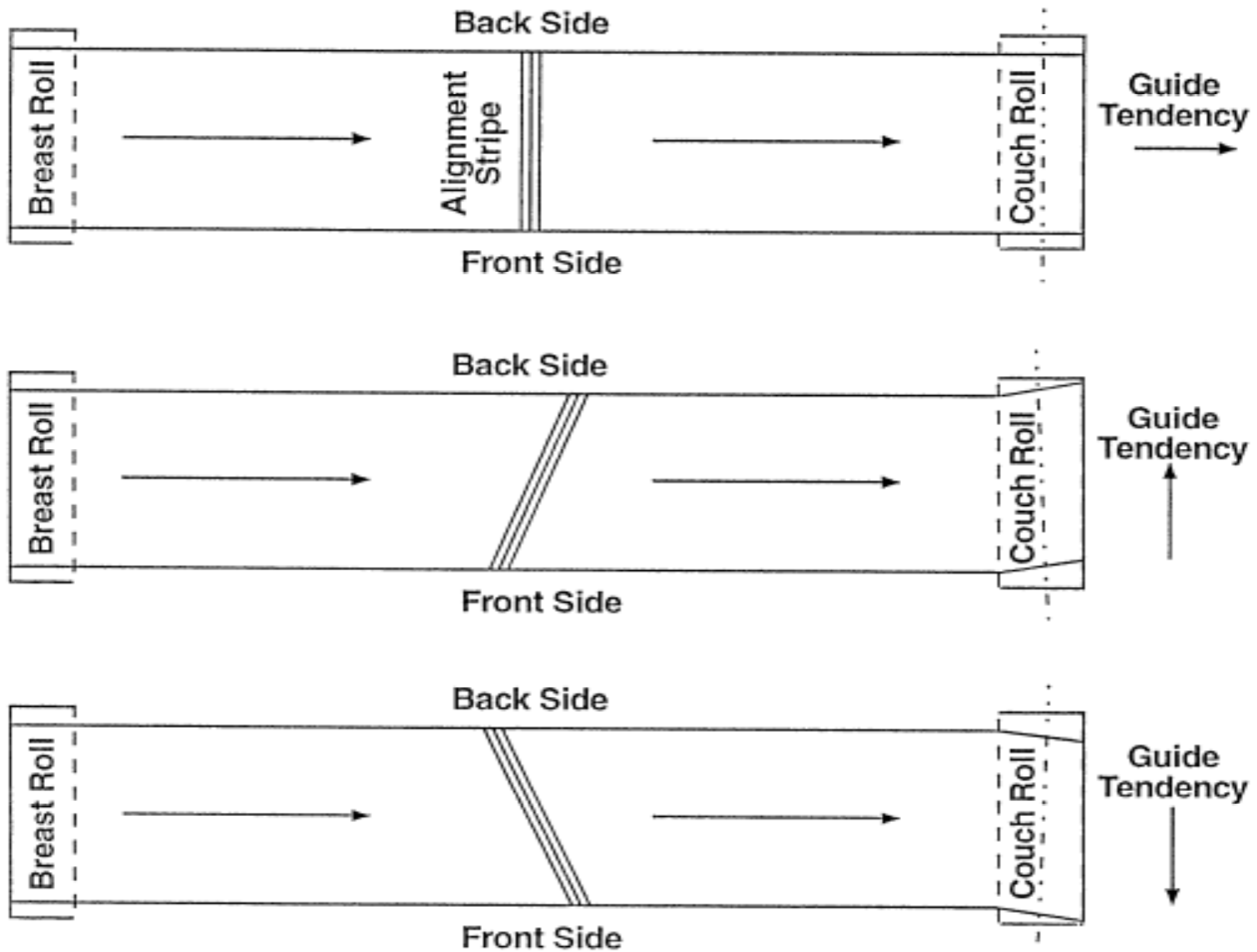


Roll 84° to Travel—Fabric Guides to Front

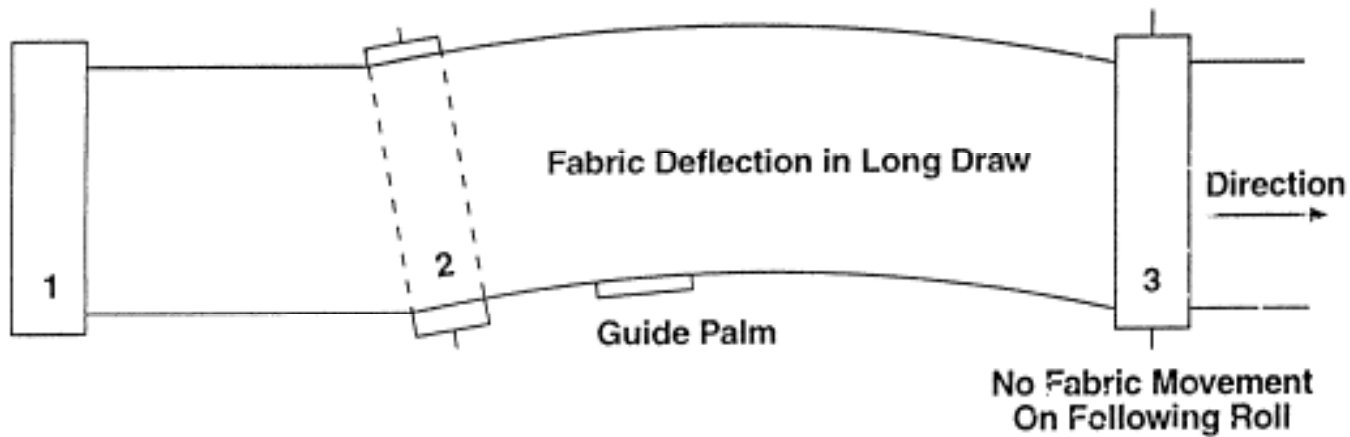
Guiding



Guiding-Cocked Couch or Breast Roll



Improper Guide Roll Location



To improve guiding, move the following roll (3) closer to the guide roll or increase the stroke of the guide unit.

The guide palm should be located following the guide roll (between 2 and 3 as shown in the above sketch) for fabric operation. In this area The palm, immediately senses movement of the fabric caused by the guide roll. If it is located prior to the guide roll (between rolls 1 and 2), wait one complete fabric revolution to sense the movement produced by the guide roll.