

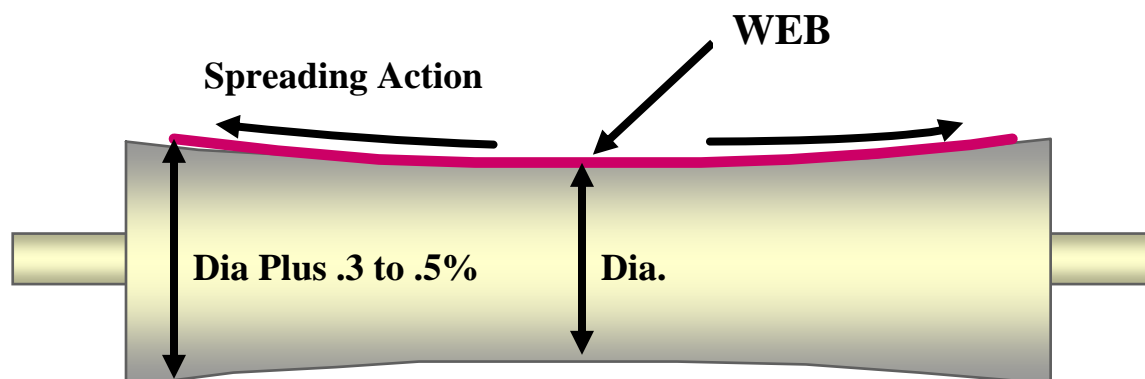
How To Get The Most From Your Web Spreader

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Almost all web processing systems require web spreading before critical components to remove wrinkles or for slit web separations. Unfortunately, many of the spreader devices are misapplied or not properly adjusted. This results in not getting the web spreading action desired.

This Tech Tip will discuss the various types of spreader commonly used in the web converting industries, will give a description of the spreading mechanism, gives application information and lists the Pro and Cons for using this type of spreading device. We hope that you will find this information helpful in overcoming your web spreading challenges.

Reverse Crown Spreader



Description – A conventional roll, normally an idler but may be driven, that has a diameter at the ends slightly larger than the diameter in the center of the roll. Since the roll has a constant rpm, the surface speed is greater at the ends than the center. The surface speed difference causes an ingoing web tension distribution that is shaped similar to the speed profile. The rolls spreading action is a function of this web tension profile difference. It is important that this roll has a good traction surface to achieve the spreading action.

Application:

- Wrinkle removal
- Most effective on extensible materials
- Web wrap should be greater than 90°
- Poor man’s reverse crown roll is tape on ends of roll at edges of web

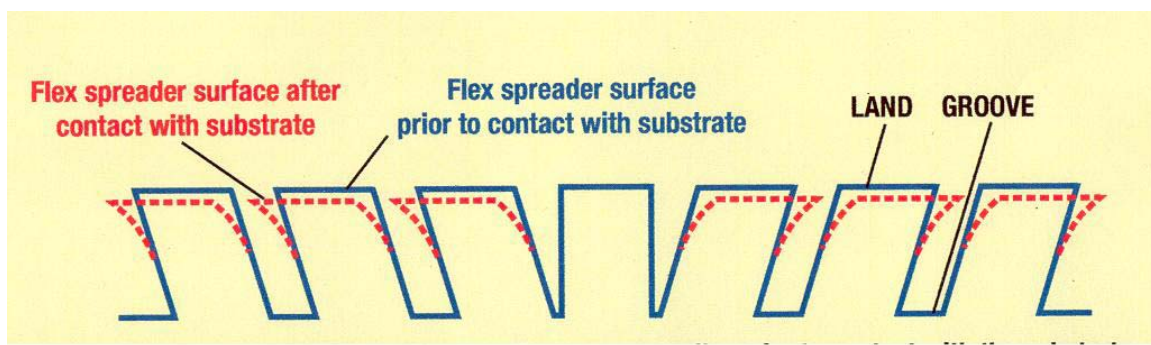
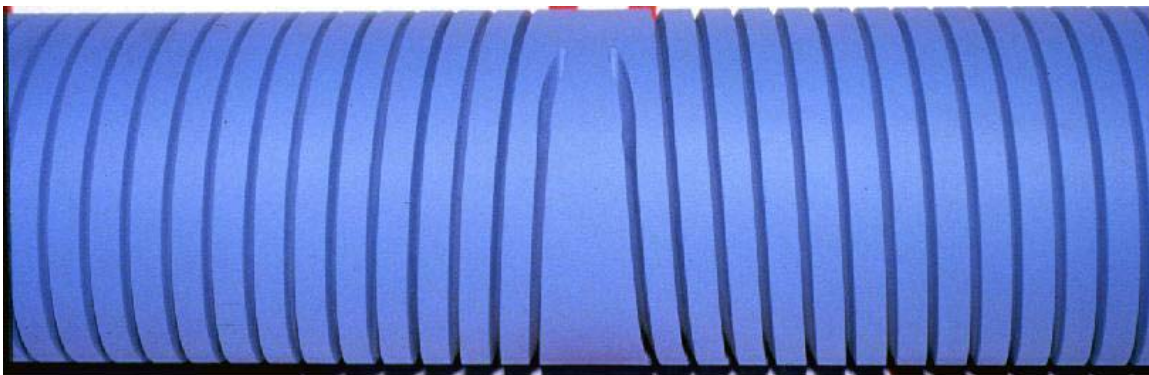
Pros:

- Simplest to operate and adjust
- Least expensive type of web spreader
- Easily retrofitted

Cons:

- Very product dependant as the amount of reverse crown depends on extensibility of web
- No control on amount of spread flexibility

Flex Spreader



Description – A straight roller that has a special grooving cut into a soft outer cover. The grooving is undercut at an angle so that the web tension deflects the lands outward, carrying the web with it to accomplish the spreading action. The amount of spreading is a function of rubber hardness and web tension.

Application:

- Wrinkle removal
- Prewind web spreading with no slitting
- Preslit web spreading with slitting
- Most effective on non-extensible materials
- Web wrap should be greater than 90°

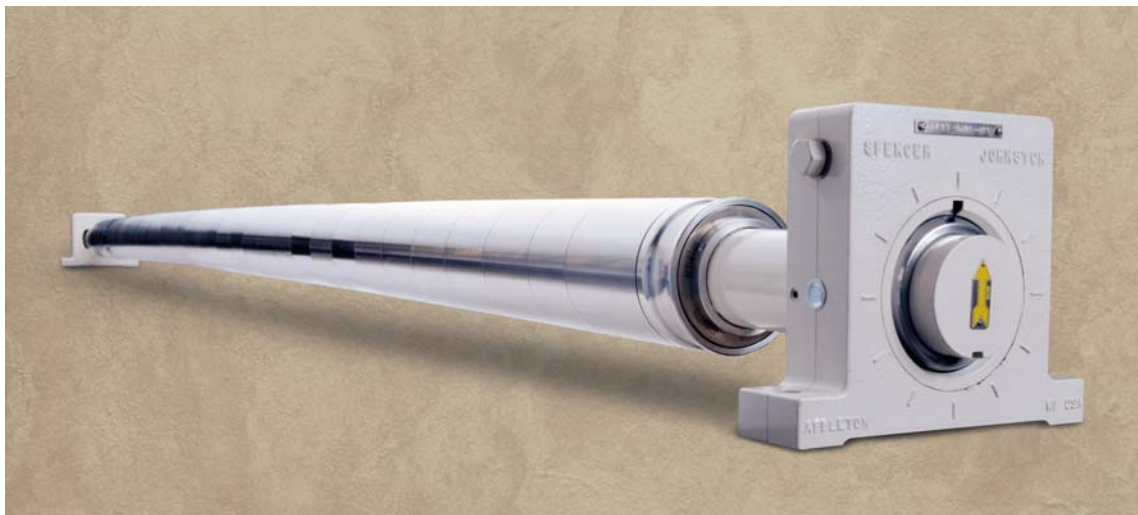
Pros:

- Relatively low cost, easily retrofit, easily operated
- Self compensates for tight or loose areas across web for more uniform cross machine web tension
- Grooving eliminates slippage due to air entrapment

Cons:

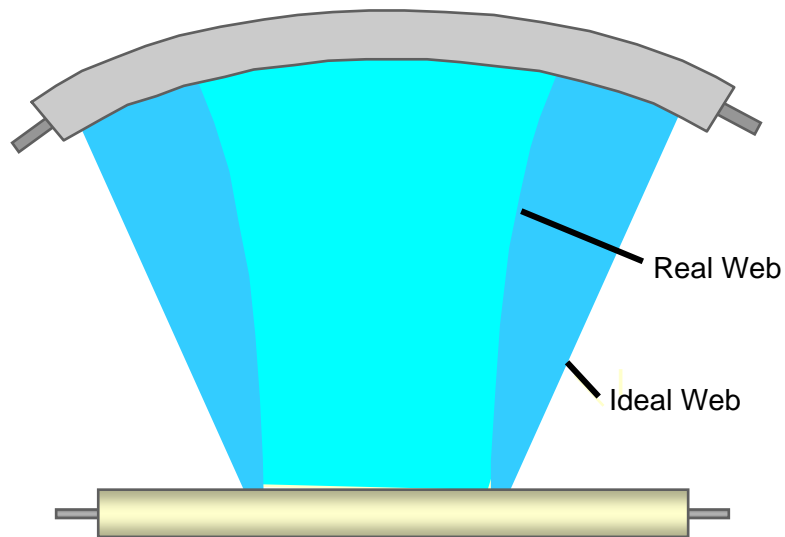
- Needs web tension to provide spreading action
- Limited control of spread flexibility

Bowed Roll Spreader



Description – A curved roll with a stationary axle on which segmented metal rotating sleeves are mounted on numerous bearing sets. The metal sleeves are typically covered with a flexible piece tube of a soft, synthetic rubber. Under high wear conditions, the outer rubber tube can be eliminated and the metal sleeves are traction coated. The web is spread by the curved axis of the bowed roll by applying the “Normal Entry” web guidance principle where the web always tries to enter the roll at 90 degrees to its (curved) axis. (See Below) Spreading action is a function of

amount of bow, wrap and web tension. Variable bow rolls have a split stationary axle where an applied force can change the amount of bow.



Application:

- Slit web separation
- Wrinkle removal
- Can be used on both extensible and non-extensible materials
- Cover or steel sleeve grooving reduces slippage from air entrainment
- Lead-in and lead-out geometry are critical for effective spreading

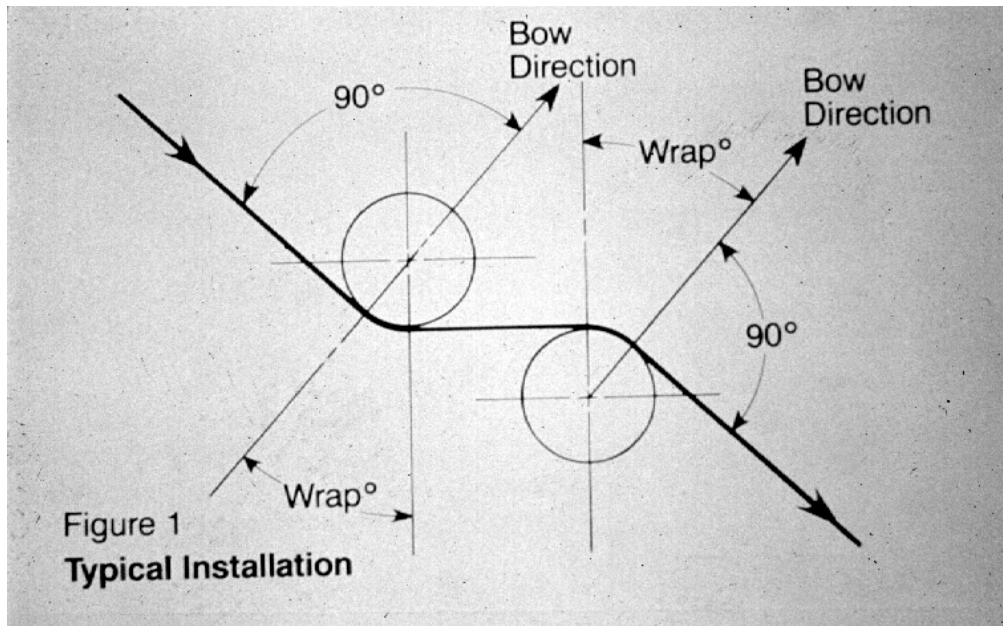
Pros:

- Can be used on processes having a wide range of material types
- Can be adjusted to tighten center or ends of web
- Readout of amount of bow available as well as automatic bow adjustment from recipe.

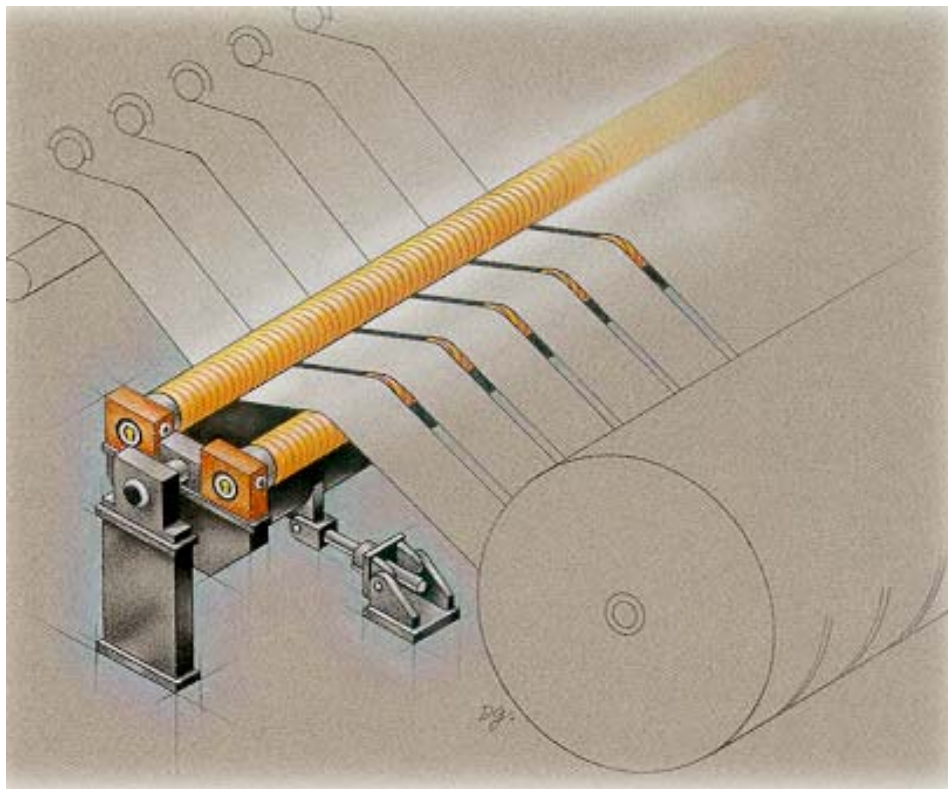
Cons:

- More complex and costly than other spreaders
- Needs to be driven on light tension applications
- Bow position and amount of bow on variable bow rollers may be misadjusted by operators
- Bearings are not able to be lubricated and difficult to replace
- Web slitting applications usually limited to four slit rolls or less

Dual Bowed Roll Spreaders



Description – Two bowed rolls that can be fixed or variable so that the lead-in and lead-out webs are parallel with the bows pointing 90 degrees to the lead-in and lead-out web paths as shown. The spreading action takes place between the two bowed roll with no spreading effect upstream or downstream. Additional spreading flexibility can be provided by a rotateable table to vary the amount of wrap.



Application:

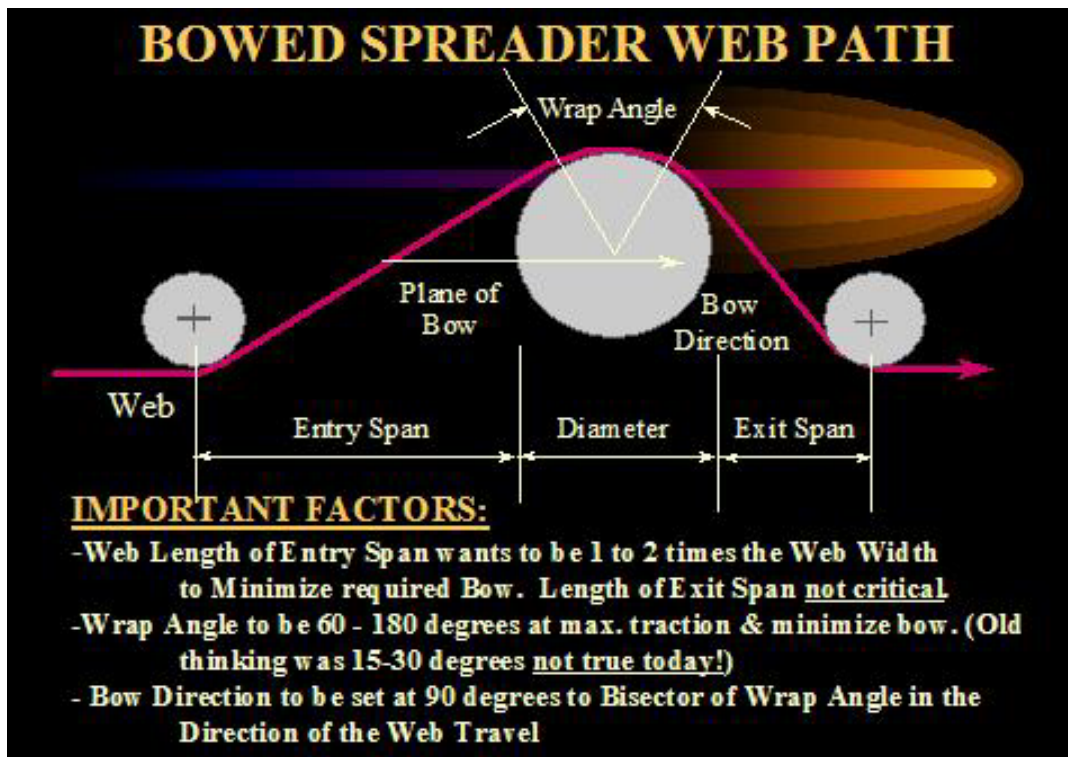
- Slit web separation for slitting and spreading multiple rolls (usually 5 or more)
- Can be used for a wide range of material and slitting variations
- Roll may be fixed or variable bow.
- Parallel lead-in and lead-out web leads and sufficient distance between rollers for web separation are critical. Suggest a greater distance between roller than shown in Figure #1 above.
- 1st and 2nd rolls will most likely have different amounts of bow due to deflection from tension vector.
- Spreading action function of amount of wrap, bow and web tension

Pros:

- Web path length the same at center and ends
- No upstream or downstream spreading action
- Excellent control of spreading action
- Can be adjusted to tighten center or edges of web by slight bow direction

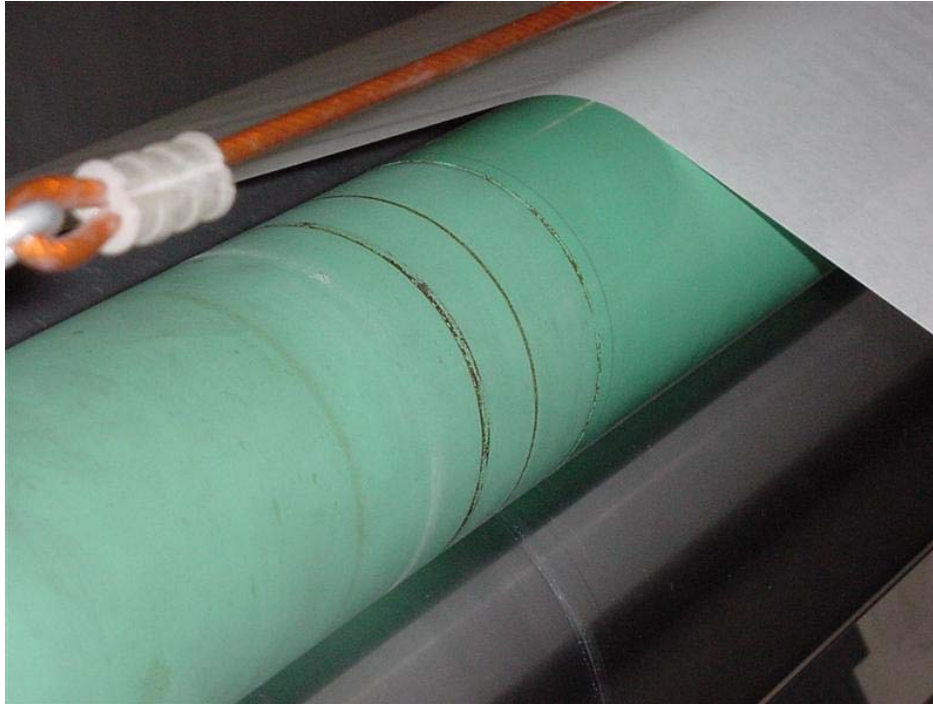
Cons:

- More complex and costly than other spreaders
- Needs to be driven on light tension applications
- Bearings difficult to lubricate and replace, and may be difficult to thread
- Bow position and amount of bow of variable rollers can be misadjusted by operators



Single Bowed Roll Configuration & Important Factors

Bowed Rolls Maintenance Tip – If operators find that they must rotate the bow directly into the web in order to get spreading or proper web separation, then there is slippage between the web and the roll. The rotating spreader has become a stationary spreader device such as a bent pipe or D-bar type spreader. Check to ensure the covering rotates freely. If it does, then the covering has become glazed and needs to be roughed-up or the cover may need to be vent-air grooved to restore traction. If it does not, the most likely one or more bearings have failed and the roll needs to be replaced and sent out to be refurbished.



Glazed Bowed Spreader Roll
Photo Courtesy of John Kelley, JKL Consulting

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