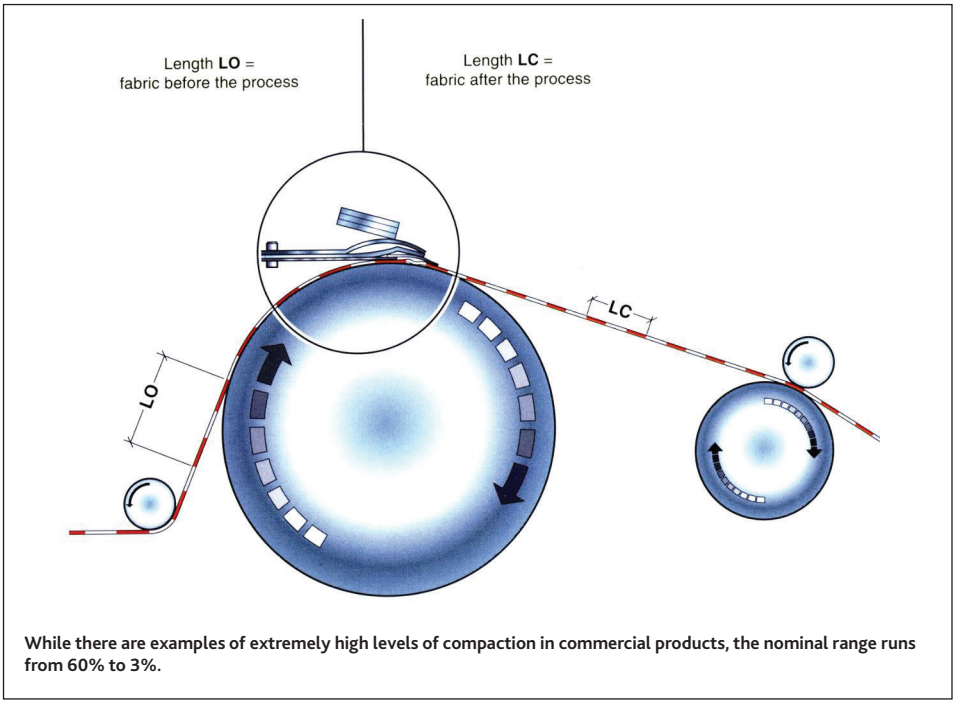
Elongation verses Compaction:

Roll goods professionals are used to the concept of "stretch". Understanding compaction, how it is defined, and how compaction relates to stretch is more complex and often confusing – resulting in ambiguous specifications. It should be noted the term stretch (which implies elongation and a degree of elastic recovery) is often misused when the more appropriate term is elongation.

Compaction is defined as the percentage change in length of the material, in the machine direction. For example: If a compaction level of 20% is specified, 100 meters of material enters the MICREX/Microcreper and 80 meters come out a finished roll with the basis weight proportionately increased (total weight unchanged).

The MICREX/Microcreper system consists of an Unwind, MICREX/Microcreper and a Winder. The purpose of the system is to produce a specific level of "compaction" in the finished roll of material. In order to provide the correct level of compaction, the MICREX/Microcreper drive and the winder drive is integrated as shown below.



While there are examples of extremely high levels of compaction in commercial products, the nominal range runs from 60% to 3%.

How does this relate to elongation? Depending upon a number of process variables as well as the nature of the compacted sheet, some or all of the compaction can manifest itself as elongation. A material compacted 50% can then represent 100% elongation.

Keep in mind that the system is designed to deliver a consistent level of compaction in the finished roll. When samples are subsequently cut from the finished roll, these samples may grow or shrink as they seek a relaxed state – understating or overstating the compaction setting.

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Measuring Compaction:

There are three suggested ways to measure the amount of compaction in a web after processing.

By weight is the most accurate. Weighing a controlled sample of a material with a known basis weight after creping tends to be the most reliable method of measuring compaction. For example a material with a basis weight of 50 grams per square meter when creped may have a finished basis weight of 55 grams per square meter. This 10% increase in weight would correspond to 10% compaction.

While this is potentially the most accurate method, there are possible errors.

1. Microcreped material can in some circumstances grow in width during processing.
2. Due to the heat used in processing, any moisture present in the web may be reduced – lessening sample weight.

By measured length has the best combination of accuracy and simplicity. Place two marks on the substrate a predetermined distance apart (along the axis of the web) before processing and measure the distance after processing. If the marks were 20" apart before and 18" apart after processing, there is 10% compaction.

There are two cautions about this method:

1. There is a real potential to make errors measuring the distance between two marks after creping. The crepe profile itself will deform the marks.
2. Due to variations in the base substrate as well as how the material may have been handled subsequent to measuring, it is inaccurate and therefore unreliable to measure over too short a distance. At MICREX our policy is that anything under 10" is unreliable, and that 20" is preferable.

Index marks printed during the formation of the web can provide a good measure of compaction – as long as they are a sufficient distance apart.Keep in mind that the system is designed to deliver a consistent level of compaction in the finished roll. When samples are subsequently cut from the finished roll, these samples may grow or shrink as they seek a relaxed state – understating or overstating the compaction setting.

By hand-stretch is the simplest. Place a series of marks at a predetermined interval (such as 1") on the compacted web parallel to the axis of the web. Pull the web so as to remove all the compaction, and measure the distance between the marks.

There are three draw-backs to this method:

1. Because the marks are only a small distance apart, the "resolution" of the data is limited.
2. It is difficult to judge the correct tension to fully pull out the compaction in the web.
3. In some substrates the compaction becomes permanent and cannot be pulled out and shown as stretch.

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