
Adding Extensibility

Broadly defined there are three technologies for adding extensibility to cellulosic products.

1. Traditional Wet Creping (including X-Crepe™)
2. Rubber Belt – usually referred to as the Clupak® process
3. Dry Creping - as performed by the nine different configurations of Micrex®/Microcrepers™ (The Micrex Process™).

Each of the technologies differs significantly in:

- How they work
- Economics
- Environmental impact
- What kinds of substrates process
- Physical properties of the resulting sheet.

This note will contrast these wet technologies relative to the Micrex/Microcreper.

The Wet Process

Wet crepe and rubber belt machines both rely on aqueous solutions and / or steam as an integral part of the compressive treatment process. The ability of the substrate to both receive and tolerate moisture defines both the set of substrates which will process, as well as hugely impacting the physical properties of the resultant sheet. For example, a nonwoven or film substrate simply cannot withstand the wetting and subsequent drying involved in these processes.

As moisture is added to the substrate; it later has to be removed by drying. If there are additives to the solution to enhance creping, these additives can negatively impact the finished web. This wetting and subsequent drying cycle adds both expense and environmental considerations.

A further limitation of wet technologies is that by definition the process is limited to the substrates which will not be harmed at temperatures where water can be applied and then removed by drying. This eliminates a wide range of products which either cannot withstand the temperatures necessitated by drying, or the reverse – require temperatures in excess of 100 C to impact the thermoplastic characteristics of the fiber.

Finally, the application of water and the subsequent drying is impactful (positive or negative) on the characteristics of the finished product.

In summary, most applications currently utilizing a wet technology are highly refined, with a base substrate that has been selected and optimized specifically for the process and application. To state the obvious – a company only wet-crepes substrates which work well in the process.

Potential customers often assume that by taking an existing proven substrate and applying the Micrex Process they can capture the improved economics of a dry, high speed process and end up with a product with similar physical properties to wet creping.

This is rarely the case. As a generalization, a substrate creped dry as opposed to wet will have:

- Greater bulk
- Much higher levels of compaction (stretch)
- “Softer” crepe – meaning under load there is less retention of the crepe.

A simple analogy. If one were to iron a shirt with just a hot iron – the results would be very different than if a starch and water solution were applied. Taking the analogy one step further, if the hot iron and starch “technology” were applied to a range of other clothes (leather, silk, synthetics, etc.) – the results would be disastrous.

For all these reasons Micrex tries to direct customers from trying to substitute The Micrex Process for an existing wet process. The philosophy of Micrex is all Microcreped products are by definition – new products. This means every application is an opportunity to reevaluate the selection of base substrate and what physical properties are required.

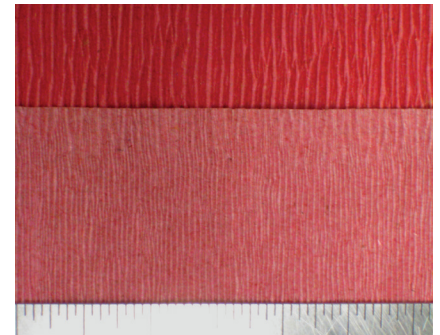
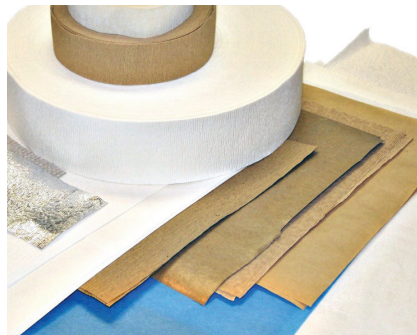
Two Examples:

- Wet-creped paper for electrical insulation has been an industry standard for decades. Yet as motors and transformers have become smaller and hotter, a new generation of insulating substrates utilizing aramids has been replacing the traditional paper. These new materials crepe on a Micrex/Microcreper where they will not process at all in a wet process.
- For packaging, because of both the increased bulk as well as the added “softness”, Microcreped papers outperform traditional wet-crepe. Carpet-backing is similar application.

For all these reasons, Micrex encourages customers to think “outside the box” about their creping needs.

Taking an existing substrate optimized for wet creping, running it through The Micrex Process and looking for the same physical properties as wet-creping is likely a path to disappointment.

Instead, by combining a customer’s in-depth knowledge about a particular product with Micrex’s expertise in compacting a wide range of substrates – a whole new generation of proprietary product is possible.



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