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High density papers -- what are they?

Scope

This technical information paper is intended as a guide for better understanding of high density papers and their characteristics in relationship to corrugator production. High density papers have in the past been known as “high performance liners” or “high ring crush liners” however shifts in papermaking technology mean that this definition may no longer provide sufficient description of high density papers bot liner and medium.

Safety precautions

No safety precautions apply.

Background

High density papers have lower bulk density than papers produced without the aid of increased pressure and/or dwell time in conditions on the paper machine with the same strength as regular paper grades but produced at a lower weight. This process gives more compression strength per pound of fiber than conventional liner, thus reducing total fiber use.

Papers that are manufactured on paper machines equipped with new “high intensity nip pressing” (there are various types including but not limited to “extended nip press”, large diameter roll, long nip and shoe presses) to improve the fiber to fiber bonding rate as well as increasing water removal. As a result some strength properties, most notably cross direction stiffness, increases compression strength. Changes in wood species, pulp refining, fiber orientation and introduction of lighter weight papers that do not have the minimum basis weight limitations as described for Mullen based corrugated in the original Rail Freight Rule 41 and the Truck Freight Classification Rule 222. In time both sets of carriers recognized the benefit of lower basis weight papers providing adequate shipping protection and Alternate rules accommodating these papers were introduced.

In cases of a high degree of densification, these papers these papers become “hotter” faster than bulker papers. Higher density papers have smaller interstices or spaces between the fibers making the sheet much less porous than conventional papers. The denser the sheet, the easier heat will pass through it. This is because the air pockets in the interstices have been reduced. Air is an insulator compared to cellulose fiber. Reducing the porosity in the sheet by increasing pressure and in other ways also increases the potential of bonding problems because of poor penetration of adhesive into the interstices and poorer transmission of water and vapor away from the glue line.

Photomicrographs

Figure 1 shows 69-lb. conventional bulky Kraft liner and a new 57-lb. high performance liner. Also shown are 42-lb. conventional bulky Kraft liner and the new 35-lb. “high performance liner”.

Higher density, tighter sheets (presumably because less air is trapped within the sheet) will transmit heat faster than bulker Kraft liners.

TIP Category Automatically Periodically Reviewed (Ten year review)

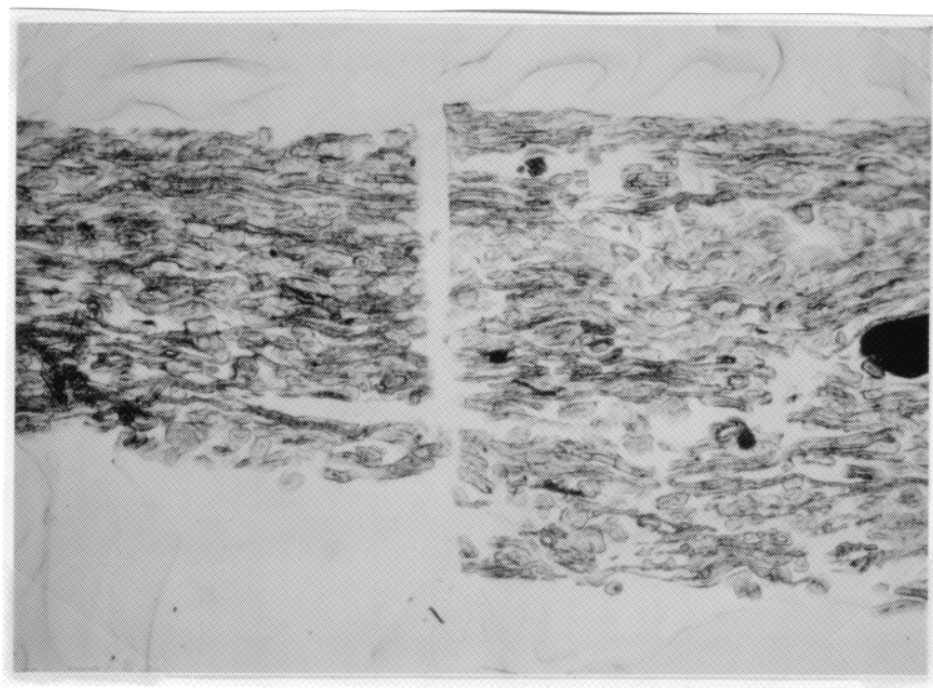
TAPPI



Documents

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57# High performance 69# Kraft



42# Kraft 35# High performance

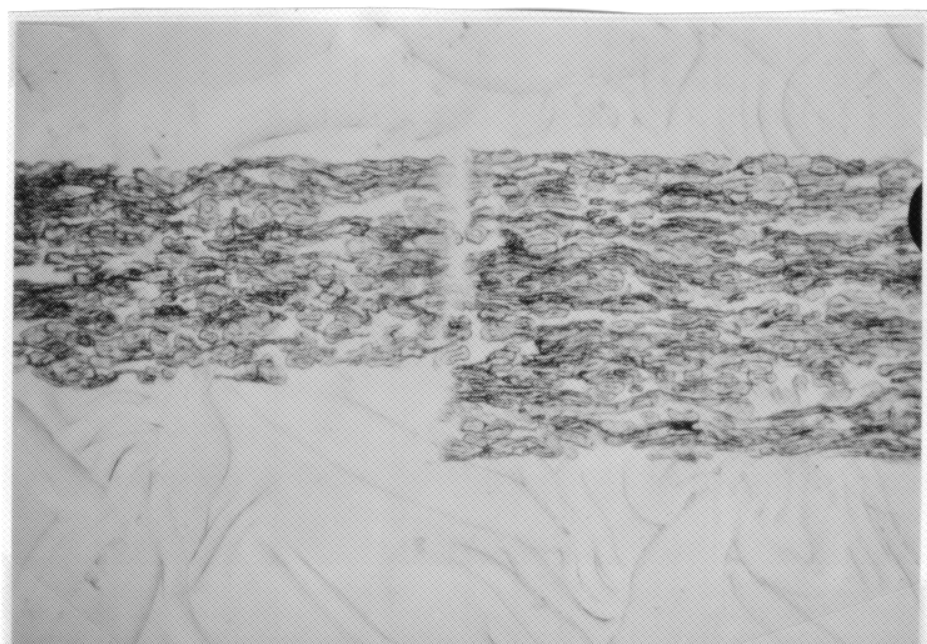


Fig. 1. Photomicrographs showing 69-lb. conventional bulky Kraft liner and a new 57-lb. high performance liner. Also shown are 42-lb. conventional bulky Kraft liner and the new 35-lb. "high performance liner."