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**Paper Title:** *A New Hybrid Fiber Filler Composite: A comparative pilot scale development and study of different fillers on digital printing paper properties.*

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**Abstract:**

The paper industry in North America produces approximately 90 million tons of paper and paperboard annually. According to the American Forest & Paper Association, the paper industry creates more than $200 billion annually in financial revenue, employs over 1 million people and is in the top 10 list of manufacturing employers in 48 states [1]

The use of fillers in printing and writing papers has become a prerequisite for competing in a global market. Paper products require the use of approximately 3.5 million tons of filler material annually with an estimated 5% annual increase [2,3]. The use of filler is a common practice in today’s paper industry, but the choice of fillers for each type of paper varies widely according to its use.

The market for uncoated digital printing paper is one that continues to introduce exciting growth projections and it is important to understand the effect that different types of calcium carbonates have on the paper properties.

Today’s filler level range in uncoated digital printing paper in North American is limited between 10 and 20%, but is expected to increase due to future implemented cost savings and quality requirements.

The proposed paper reports from a research and development project that is currently underway at ESF, Department of Paper and Bioprocess Engineering. The study compares commercial available filler products with a new developed “Hybrid Fiber Filler Composite Material” and how main structural, optical and strength properties are affected by increasing the filler content of at least 5% over commercial values. The study consists of: (i) an overview of paper filler materials used in the paper production process, (ii) discusses the manufacturing technology of lime based filler materials for paper applications, (iii) gives an overview of new emerging paper filler technologies, (iv) discusses a filler evaluation of commercial available digital printing paper products, (v) reports from a detailed handsheet study and 12” pilot plant paper machine trial runs with the new Hybrid Fiber Filler Composite Material, and (vi) evaluates and compares commercial filler products and the new Hybrid Fiber Filler Composite Material with a life cycle analyses that explains manufacturing, economic and environmental benefits as they are applied to uncoated digital printing papers.

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