Cork Tech TalkNews

Manufacturers of Waterbase, UV+EB Curable Coatings, Varnishes and Adhesives

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SYNTHETIC PAPERS CAN BE A SMART CHOICE

Print them and coat them, use aqueous, UV or EB coatings, treat them pretty much like wood-fiber -paper substrates and benefit from attributes that make synthetic papers unique.

Synthetic papers are chosen for graphics applications because they offer an improved set of properties, highlighted by durability.

Synthetic papers were commercialized in the late 1960's. Since their introduction they have found an increasing variety of specialty applications where their unique properties offer benefits. Additionally, each decade has seen new manufacturers introduce more varied competitive choices.

Synthetic papers are plastic based products, inherently dependent on petroleum feed stocks. The economics of synthetic papers are, therefore, dependent on the price of petroleum. Historically, synthetic papers have been more expensive than wood-fiber-papers and judging by recent higher petroleum prices they most likely will become even more costly.

Synthetic papers' usage has been reported to be growing at around 8% per year. This may be contrasted with the 4% per annum growth rate estimated for all plastics. The majority of usage falls in labels followed by commercial printing. The projected growth may slow if the price differential between synthetic paper and wood-fiber-paper widens even more.

It can be said that three types of synthetic substrates vie for applications. There are traditional plastic films, new more paper like plastic films and high-end synthetic papers.

The latter attempts to match up with paper properties; bright whiteness, dead-fold and stiffness characteristics, opacity, low COF, puncture strength, ink adhesion (especially water based inks), and workability with all of the print processes. More traditional plastic like films, more often than not, lack in stiffness.

Many synthetic papers work well in a wide range of printing processes including flexography, gravure, letterpress, lithography, screen, thermal transfer, ion deposition, dot matrix, inkjet and laser, (without pre-treatment.)

However, it is fair to say that somewhat more care and patience is required when printing and converting synthetics. Basically, high solids inks formulated for synthetic non-absorbent papers are required for the best results. Care must be taken regarding humidity, stacking, and drying. Since ink is not absorbed by the stock, control of ink film thickness is critical, as the thinnest possible ink film should be the rule. When printing and/or coating it must be recognized that drying times could be expected to exceed those necessary for wood-fiber-papers, which are absorptive.

Synthetic papers having the durability of plastic offer a combination of properties that are found attractive by a number of market applications. Like tough plastics, synthetic papers are water, grease, weather and chemical resistant, are durable with good tensile strength and resist tearing in both directions. Further, they are capable of withstanding repeated flexing and bending, are resistant to cracking, shrinking and distortion. This combination of properties

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offers a uniqueness that traditional paper does not.

Typically, synthetic papers like wood-fiber-papers can be die cut, embossed, foil stamped, glued, perforated, stamped, and, with limitations, some can be thermoformed.

Synthetic papers are available that are FDA compliant for direct food contact, non-toxic when burned, and recyclable.

Photo courtesy CCL

Paper is easily the most widely used substrate for packaging labels. Synthetic materials are gradually eroding papers' market share due to the increasing need for more durability, shrink properties, security, and the no-label, transparent look. Increasingly, synthetic papers are finding applications on beverage and juice containers. There are even applications reported developing with multi-wall bags and pouches converting to synthetic materials.

Synthetic papers are finding increased use in niche markets such as, banners, books, book jackets, business cards, drivers licenses, other ID cards, game boards, instructional manuals, maps, menus, posters, recipe books, signage, tags, tickets, etc.

Recently, synthetic papers are benefiting from a movement in Europe to replace PVC film for "green" reasons.

Plastic resins are the key to synthetic papers. Synthetic papers are formulated from combinations of minerals, resins, and additives to yield paper like substrates. These range from substitute white bond to brown kraft and most everything in between.

Resins typically involved are polypropylene (PP), high density polyethylene (HDPE), polyethylene (PE) and polyolefin's. These plastics are manipulated by extruding in mono or multi-layers, calendaring, bi-axially or linear orienting, etc.

Resin obviously has a large impact on synthetic paper attributes. For example, HDPE provides good stiffness and dead-fold, both useful in bag applications. PE provides tear resistance. Synthetic paper formulations have become very complex as suppliers vie for advantages. Some formulations are known to bring together as many as 6-10 different raw materials, minerals, resins and additives to manufacture paper-like products.

Opacity, printability and whiteness are properties produced by introducing inorganic fillers. Fillers add to opacity, ink adhesion, impact strength, and dead-fold properties. Negatively, they add weight and reduce puncture strength. Fillers used vary by synthetic paper manufacturer based on their property targets. They range from talc, mica, and calcium carbonate, to absorptive precipitated silica. Particle size also is varied as competitive benefits are sought.

Surface coatings, clay for example, applied to synthetic papers by producers yield improved properties, such as scratch resistance, tear strength, water resistance, a paper feel, and importantly, printability.

UV inks and coatings work well on most synthetic papers, although some may require a primer coating in order to wet and adhere acceptably. Since energy curables cure rather instantly, set-off is not an issue. Also since they are 100% solids, thin ink films can be run and solvent attack is not a potential problem as it is with solvent inks.

Aqueous and UV top coatings can be highly effective in protecting the printed image while providing excellent abrasion, rub resistance and high gloss to matte enhancement.

Synthetic papers offer many unique advantages that improve applications to which they are adopted.

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