

Sustainable Coating solutions for Paper & Paper board



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Growing demand for Sustainability & Importance of Sustainable packaging

Many governments across the world have imposed stringent regulations to promote sustainability. Government of Maharashtra has enforced Plastic waste management directive which has broad ramifications for the packaging industry and provides excellent opportunity for paper and paperboard based packaging solutions. It is getting clear that the government wants to eliminate dependency on landfills as there is a growing need to make land available for the growing population. There is need for innovative eco-friendly & sustainable packaging solutions. There has been a conscious and joint effort from brands, converters, film manufacturers, paper mills etc, in developing green packaging solutions. Nowadays the consumers are aware of what they are buying and how it affects them and the environment. Buying trends are affected by this. Eco-friendly, recyclable packaging is what the millennials look for. This is another driving force for the industry to switch to sustainable packaging solutions. Another aspect to the growing demand for sustainability is conscious capitalism. Many organizations are now not only focussed on business but they feel responsible to the community and the environment.

Switching to sustainable packaging can also benefit in the following ways

1) Increase Product-to-Package Ratio

Several products have many layers of packaging which is not a crucial requirement for the product. Eco-friendly packaging also means using less packaging material overall, down gauging and downsizing will contribute to sustainability. Packaging should

be as compact as possible while still keeping your product protected. Efficient packaging is easier for retailers to handle and stock on store shelves

2) Attract new customers with Green packaging

Purchasing power of millennials are on the rise and they are especially interested in choosing socially and environmentally responsible brands. By using recycled materials, a company's carbon footprint and resource consumption can reduce.

3) Individual and community health & safety

Sustainable packaging ensures worker & consumer exposure to potentially toxic and hazardous chemicals is minimized.

4) Easy to use packaging promotes increased consumption

Whether you produce food or pharmaceuticals, you can encourage sustainable consumption by making it easy for customers to use as much of your product as possible before they need to dispose of it

5) Reduced Logistic cost

Lightweights/down gauging leads to smaller/fewer rolls/boxes, thereby reducing space and emissions.

Paper as a packaging material

Recyclability is the major challenge in the use of plastics for packaging. Plastic is not biodegradable and hence accumulates in landfills, polluting the environment. Paper is an alternative to plastic, however there are several challenges in using paper for packaging.

1) Paper used as packaging especially as a grocery bag is less durable and more likely to get wet compared to plastic

which is sturdier and water proof. It is easily tear able.

2) Unlike plastic, paper is not flexible, due to which it cannot be used for packaging of all kinds of products.

3) Barrier properties- paper has poor barrier properties. Food packaging requires a high barrier property to prevent spoilage of food.

4) Unlike plastic which is light and doesn't take up much space, paper is difficult to handle because of its bulk material

Despite the limitations of paper in packaging, Paper has gained popularity, since it can be recyclable and is environmentally friendly, renewable and biodegradable. Paper provides a versatile and responsible packaging solutions for product manufacturers, retailers, and consumers. This along with the government regulation make paper the best replacement option to plastic and can be used for packaging of several products.

The limitations of paper can be overcome by the use of barrier technology. Improving paper's barrier properties is seen as a crucial step in increasing its viability as a packaging material. The missing performance and barrier properties of paper can be compensated by, Wax impregnation, Extrusion coating, & Water-based coatings.

Water based coatings for Paper

With the push towards sustainability, repulpability and recyclability, water-based technologies are gaining acceptance. The packaging combines the best aspects of two materials: environmentally friendly paperboard and good barrier properties of water-based coatings. Water based Coatings can be recycled, repulped and/

or composted. They are an alternative solution to current wax, PE extrusion coating and film lamination.

These green solutions are eco-friendly and can provide barrier properties to paper making it a suitable substrate for packaging, coatings can also improve and impart Oil & Grease resistance on paper, water repellency on paper, it can also improve the aesthetics of paper used for packaging. Barrier coatings can improve paper's barrier properties which is a crucial step in increasing its viability as a packaging material. The MVTR values that can be achieved is 10 gms/m²/24 hr and OTR value is 70 cc/m²/24 hr Barrier coatings can also help in achieving the OTR & MVTR values required for dry food products. OTR value of less than 50, & MVTR value of less than 5 can be achieved for dry foods like sugar/salt sachets etc.

Coatings as a replacement to PE- Paper cup Coatings

Paper cups are an alternative to plastic cups. However the disposable paper cups is a major sustainability issue because contrary to common belief, they are not recyclable. Their plastic lining ensures that they almost never make it to a recycling plant and they are not biodegradable. This is important because they are the second largest litter waste product, second to only plastic bottles.

Current paper cups are made out of paper and are coated with low-density polyethylene (LDPE) or wax to prevent liquid from leaking out or soaking through the paper. With water based technology, the PE in paper cups can be replaced with coatings, this not only eliminates the plastic lining used in conventional paper cups, but also eases the recycling and repulping process. Along with its recyclable and repulpable properties, it also provides excellent water, oil & grease resistance and a very high seal strength. It has been tested successfully for hot, cold,

and deep freeze applications. Coating can be done by a gravure or rod coater. This solution is suitable for frozen foods, hot and cold beverages, fried snacks etc.

Benefits

- Plastic waste management (PWM) regulation compliant
- Water-based, green chemistry
- Recyclable & Repulpable
- Water, Oil & grease resistance, Oxygen/moisture barrier.
- Heat Sealable
- FDA approved
- Down-gauging

Paper cup - coating details

Base coat	
Base coat weight	2 gsm / dry
Solid Content	53%
pH	7.0- 8.0
Brookfield Viscosity	250 - 450
Spindle	3
RPM	60
Recommended coating method	Gravure, Rod coater
Recommended drying condition	Hot Air Dryer
Top coat	
Top coat coating weight	2 gsm / dry
Solid Content	53%
pH	8.0-10.0
Brookfield Viscosity	<500
Spindle	2
RPM	30
Suggested coating method coater	Gravure, Rod
Suggested drying condition	Hot Air Dryer

Recommended application conditions

Paper Board	Cup stock 140 – 300 gsm
Cup sealing condition	2 bar pressure / 140 ~ 180°C
Ultrasonic Sealing	Same as existing extruded PE Cup forming settings
Cup sealing speed	40 – 150 cups/min
30 minutes cobb value	2 g/m ²
3M Kit Value	10

Coatings for Paper bags- An alternative to Plastic Bags

Plastic bags take a huge toll on our planet. It is non-biodegradable, chokes rivers, oceans, clogs drains, causes floods, and

pollutes land, soil, water and air. Recently the government has imposed the ban on single use plastic in Maharashtra. An eco-friendly alternative to plastic bags are paper bags. Benefits of paper bags are plenty, however the only drawback of paper bags are that they are porous and lack the barrier properties that are required. With water based coatings, it is possible to improve the barrier properties of paper, making it suitable for use. Some coatings can even impart heat seal properties to paper. This can completely eliminate the use of adhesives in bag manufacturing process. Coatings can provide barrier properties like water repellent properties, oil & grease resistance, oxygen/moisture barrier etc. These coatings are FDA complaint and are completely recyclable and repulpable. A COBB value of less than 10 can be achieved on kraftpaper bags for grocery using water based coatings.

Coatings for water barrier on paper and paper board

Coatings that improve the water barrier on paper and paper board can be used for packaging of sea foods, fruits, etc. These can be used for deep freeze applications e.g. Ice cream tubs, frozen food etc. These coatings have excellent print receptivity and can even enhance the aesthetics of the product. A COBB value of less than 10 can be achieved for ice cream blocks using water based coatings.

Coatings for oil & grease resistance paper and paper board

Coatings can impart oil & grease resistance to paper and this can be used for many applications like disposable take away boxes, which are most commonly used in restaurants, sweet boxes, sea food applications, etc.

3M kit values

Sweet boxes- Less than 10

Food Trays- Less than 8

Coatings for Staple free Tea bags

FSSAI has recently banned the use of staple pins in packaging of tea bags. The use of stapler pins in tea bags can be a potential hazard to consumers. Coatings can be used to replace staples in tea bag packaging. These coatings are heat sealable and will seal the paper to the thread as well as the bag. This FDA approved coatings can be the best sustainable option for tea bags.



(Image is for representational purpose only)

Coatings for Aesthetics

Water based coatings can improve the Aesthetics of the paper/final product. Haptic coatings can enhance the look and feel of the product and can increase the shelf appeal of the product.

Michelman Innovation Centre for Coatings (MICC)

Michelman's dedication to innovating a sustainable future is well represented in their investment in the Mumbai-based Michelman Innovation Centre for Coatings (MICC). Dedicated to developing recyclable and sustainable solutions, this state-of-the-art packaging incubator is strategically designed to serve the needs of India and its surrounding markets to allow for the fast & efficient development of sustainable packaging. Their holistic approach of dedicated space, collaborative innovation and technology allows all members of the packaging value chain, including brand owners, film producers, and converters to access the tools needed to develop innovative and sustainable solutions for the natural environment and their businesses.

Dedicated Space

Michelman's state-of-the-art packaging incubator provides the opportunity to evaluate new technology, prototype innovative structures and quickly commercialize superior packaging. Their application and materials experts are



ready to help develop solutions when new opportunities arise. The Centre allows for hot tack testing, Gelbo testing, and has an Ultrasonic Stirrer. Although equipped with 4 Mocon@s for OTR/MTVR testing, the centrepiece is a Dual-Station Pilot Coater Laminator that allows packaging manufacturers to test new concepts without stopping their production lines.

- Multifunctional coating heads for various coating methods or adhesive application
- Multiple printing process
- Ability to coat a wide range of substrates up to 400-micron thickness
- UV Top and Heat Nip Lamination capability
- Application testing lab

Collaborative Innovation

Michelman has a long tradition of innovation and sustainability with water-based chemistry. Because of this, their technology experts offer all members of the packaging value chain the ability to collaborate and decrease the time it takes

for the commercialization of improved and environmentally-friendly flexible packaging.

Businesses can partner with their technology experts to become Plastic Waste Management compliant. Collaboration with Michelman's technical and market experts accelerate the concept-to-commercialization cycle with innovations can produce packaging that offers:

- Recyclable structures
- Brand appeal and enhanced graphics
- Increased shelf life, food safety
- Increased productivity and efficiency
- Compostability
- Waste reduction and down gauging

Technology for India

They also have deep application and water-based formulation expertise that supports the packaging incubator. Optimized for India's ever-changing packaging market, their technology is a complete product portfolio enabling environmentally friendly and sustainable packaging solutions.

Our coatings are developed to work together, but flexible enough for individual technologies to work with existing coating systems to create superior packaging.

