BOPP Film Applications
Products End Uses

- Printing Application
- Adhesive Tape Application
- Garment Bags and Bagging Application
- Board Lamination Application
- Flower Wrap Application
- Others & Specialty Application
<table>
<thead>
<tr>
<th>CODE</th>
<th>DESCRIPTION</th>
<th>APPLICATION</th>
<th>MICRON</th>
<th>H/S</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-01</td>
<td>PLAIN FILM, ONE SIDE CORONA TREATED</td>
<td>PRINTING &amp; LAMINATION</td>
<td>18-60</td>
<td>NON</td>
</tr>
<tr>
<td>B-02</td>
<td>PLAIN FILM, ONE SIDE CORONA TREATED</td>
<td>ADHESIVE TAPE</td>
<td>18-60</td>
<td>NON</td>
</tr>
<tr>
<td>B-02A</td>
<td>PLAIN FILM, ONE OR BOTH SIDE CORONA TREATED</td>
<td>ADHESIVE TAPE</td>
<td>25-50</td>
<td>NON</td>
</tr>
<tr>
<td>B-03</td>
<td>PLAIN FILM, ONE OR BOTH SIDE CORONA TREATED</td>
<td>BOARD LAMINATION</td>
<td>12-20</td>
<td>NON</td>
</tr>
<tr>
<td>B-05</td>
<td>PLAIN FILM, ONE SIDE CORONA TREATED</td>
<td>METALLIZING PURPOSE</td>
<td>18-50</td>
<td>NON</td>
</tr>
<tr>
<td>B-06</td>
<td>PLAIN FILM, ONE SIDE OR NON CORONA TREATED</td>
<td>PHOTO ALBUM</td>
<td>40-60</td>
<td>NON</td>
</tr>
<tr>
<td>B-08</td>
<td>PLAIN FILM SUPER CLEAR, ONE SIDE CORONA TREATED</td>
<td>ADHESIVE TAPE</td>
<td>20-25</td>
<td>NON</td>
</tr>
<tr>
<td>CODE</td>
<td>DESCRIPTION</td>
<td>APPLICATION</td>
<td>MICRON</td>
<td>H/S</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>-------------</td>
<td>--------</td>
<td>-----</td>
</tr>
<tr>
<td>B-14</td>
<td>PLAIN FILM, ONE OR BOTH SIDE OR NON CORONA TREATED</td>
<td>GARMENT BAG</td>
<td>25-60</td>
<td>NON</td>
</tr>
<tr>
<td>B-15</td>
<td>PLAIN FILM, ONE OR BOTH SIDE OR NON CORONA TREATED</td>
<td>FLOWER WRAP</td>
<td>25-60</td>
<td>NON</td>
</tr>
<tr>
<td>B-16</td>
<td>HI HAZE MATT, ONE OR BOTH SIDE CORONA TREATED</td>
<td>BOARD LAMINATION</td>
<td>15,18,20</td>
<td>NON</td>
</tr>
<tr>
<td>B-17</td>
<td>MATT BOTH SIDE FILM, ONE OR BOTH SIDE CORONA TREATED</td>
<td>FLOWER WRAP &amp; DECORATION</td>
<td>35</td>
<td>NON</td>
</tr>
<tr>
<td>B-21</td>
<td>CO-EX FILM, ONE SIDE CORONA TREATED</td>
<td>PRINTING &amp; LAMINATION</td>
<td>15-50</td>
<td>BOTH</td>
</tr>
<tr>
<td>B-22</td>
<td>CO-EX FILM, NO CORONA</td>
<td>CIGARETTE WRAP</td>
<td>21</td>
<td>LOW H/S</td>
</tr>
<tr>
<td>B-23</td>
<td>CO-EX FILM, ONE SIDE CORONA TREATED</td>
<td>METALLIZING PURPOSE</td>
<td>20,25</td>
<td>BOTH</td>
</tr>
<tr>
<td>B-28</td>
<td>CO-EX ANTIFOG FILM, ONE OR BOTH SIDE CORONA TREATED</td>
<td>PACKING VEGETABLE &amp; FRUITS</td>
<td>25</td>
<td>BOTH</td>
</tr>
<tr>
<td>CODE</td>
<td>DESCRIPTION</td>
<td>APPLICATION</td>
<td>MICRON</td>
<td>H/S</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>-------------</td>
<td>--------</td>
<td>-----</td>
</tr>
<tr>
<td>B-32</td>
<td>CO-EX PEARLIZED OPAQUE, ONE SIDE CORONA TREATED, LOW H/S</td>
<td>PRINTING &amp; LAMINATION</td>
<td>25,30,35,40</td>
<td>BOTH SIDE</td>
</tr>
<tr>
<td>B-34</td>
<td>CO-EX PEARLIZED OPAQUE FILM, HIGH SLIP</td>
<td>PRINTING &amp; LAMINATION</td>
<td>25-40</td>
<td>BOTH SIDE</td>
</tr>
<tr>
<td>B-41</td>
<td>METALLIZED BOPP CO-EX FILM, ONE SIDE CORONA TREATED</td>
<td>DRY LAMINATION</td>
<td>18,20,25,35</td>
<td>ONE SIDE</td>
</tr>
<tr>
<td>B-42</td>
<td>METALLIZED BOPP FILM, ONE SIDE CORONA TREATED</td>
<td>DECORATION</td>
<td>20-50</td>
<td>NON</td>
</tr>
<tr>
<td>B-51</td>
<td>CO-EX WHITE FILM, ONE SIDE CORONA TREATED</td>
<td>PRINTING &amp; LAMINATION</td>
<td>28,35</td>
<td>BOTH SIDE</td>
</tr>
<tr>
<td>B-52</td>
<td>WHITE FILM, ONE SIDE CORONA TREATED</td>
<td>ADHESIVE TAPE</td>
<td>28</td>
<td>NON</td>
</tr>
<tr>
<td>B-53</td>
<td>CO-EX WHITE OPAQUE FILM, ONE SIDE CORONA TREATED</td>
<td>PRINTING &amp; LAMINATION</td>
<td>25,35</td>
<td>BOTH SIDE</td>
</tr>
<tr>
<td>B-62B</td>
<td>SYNTHETIC PAPER, ONE SIDE MATTE</td>
<td>PRINTING &amp; LAMINATION</td>
<td>25,30,40,50</td>
<td>NON</td>
</tr>
</tbody>
</table>
BOPP Film
Specialty Film Selections
B-28 BOPP COEX ANTIFOG

BOPP COEX (Anti-fog)

Application & Strength

- Transparent BOPP film, both sides sealable with Antifog effect; cold fog type, specially designed for fresh vegetable packaging.
- Cold fog effect by migrating additive not coat
- Able to treat on other side (not anti-fog) for printing
B-28 BOPP COEX ANTIFOG

TREATED LAYER

CORE LAYER : ANTIFOG

SEAL LAYER : ANTIFOG
Fog formation

- Enclosed air is cooled
- Capacity of water vapor is reduced
- Surface tension between plastic film and water is different
- Excess water vapor is condensed in the form of water droplets
Key antifog film requirements

- Gas permeable (vegetable can intake $O_2$ and give off $CO_2$ during breathing)
- Good water permeable (to minimize excess water vapor)
- Long shelf life of the film
- Inventory management
- Storage conditions - additives are sensitive to heat. Keep the film in cool & dry place to maximize film shelf life
ANTIFOG ADDITIVE CHARACTERISTICS

• Is added to the film to reduce water droplet formation by decreasing the contact angle between droplet & the film surface

• FDA antifog agents

• The best antifog performance at 4-10 deg C

• Minimal impact on film optical properties

• Maintain good surface retention
ANTIFOG ADDITIVE

Mechanism

♦ Mixed in bulk polymer matrix
♦ Migrate to surface
♦ Attract atmospheric moisture
♦ Water forms a continuous layer
♦ Antifogs reduce the surface tension of water
♦ Lower the contact angle of water with film surface; flatter droplets → clearer film
Mechanism

ANTIFOG

Migration

Plastic Film

Layer of Antifog molecules

Contact angle = $\alpha$

Before complete migration

Flat film of water

Contact angle = 0

After complete migration
Example of test method

♦ Cold Fog method:
  ♦ Film is secured over a container of water and placed in refrigerator at 4°C
  ♦ Formation of droplets observed
  ♦ Scalar rating criteria applied:
    1 = opaque film with small discrete droplets (A)
    10 = complete clarity; thin transparent layer (E)
    5 = 50% clarity; large discrete droplets
A/F performance rating

Rating: 1  Rating: 5  Rating: 10

A  C  E
Example of test method

• Rapid Beaker test:
  – Fill container ($\phi = 7.5 - 10$ cm) with water $90$ °C
  – Allow to cool to $85$ °C before starting test
  – Place film on container
  – Leave for $3$ second and monitor fog formation

• Result: Accept if any film found to be fog free after $3$ second
SUMMARY ANTIFOG

- Identify food application, shelf-life, and desire A/F duration, and test method
- Select suitable antifog additives for particular converter process, film structure and selected resin
- Convert the plastic materials into the form that meet packaging line requirements
- Do not alter source of supply of all ingredients once attaining desire antifog properties
B-21 BOPP COEX

- **BOPP CO-EX  printing & lamination**

**Application & Strength**
- Low heat seal temperature
- Good heat seal strength
- Clarity
- Low COF
- Good anti-static for printing process
- Down gauge to 15 microns
B-21 BOPP COEX

TREATED LAYER: FOR PRINTING & LAMINATION

CORE LAYER: MIGRATED ANTISTATIC

SEAL LAYER: LOW COF
B-22 BOPP COEX CIGARETTE WRAP

- High quality BOPP CO-EX cigarette overwrap

**Application & Strength**

- Good heat seal strength
- Good hot slip
- Low COF for High speed packing machine 400-600 ppm
- e.g. cigarette wrapping Industries, DVD over wrapping.
B-22 BOPP COEX CIGARETTE WRAP

SEAL LAYER: GOOD HOT SLIP & LOW COF

CORE LAYER

SEAL LAYER: GOOD HOT SLIP & LOW COF
B-03 BOPP PLAIN BOARD LAMINATION

- **BOPP Plain Board Lamination**
  - **Application & Strength**
    - High gloss
    - Low COF
    - Down gauge to 12 microns
    - Design specially for automatic laminating machine
    - Preventing surface from scratching
B-03 BOPP PLAIN BOARD LAMINATION

TREATED LAYER : FOR LAMINATION

CORE LAYER : MIGRATED ANTISTATIC

TREATED LAYER : for GOLD or SILVER PRESS
B-16 BOPP MATT

- BOPP Matt Film
  For Board Lamination, Labeling, Adhesive Tape

**Application & Strengths**

- Its matted side can eliminate light reflection for soft, classic-look also can be written on
- High haze matt (80%)
- High yield, especially 15 microns 83 sq.m/kg
- Low COF for automatic laminating machine
- Spot UV
B-16 BOPP MATT

TREATED LAYER: MATT, HIGH HAZE

CORE LAYER: MIGRATED ANTISTATIC

TREATED LAYER: FOR LAMINATION
B-17 BOPP MATT BOTH SIDES

- BOPP Matt Film both sides
  - For flower wrap & decoration

Application & Strengths

- Unique outlook & both matt sides can eliminate light reflection for soft
- High haze matt (85%)
- High yield
- Able to print on one or both sides
B-17 BOPP MATT BOTH SIDES

TREATED LAYER: MATT, HIGH HAZE

CORE LAYER

TREATED LAYER: MATT, HIGH HAZE
B-41 METALLIZED BOPP COEX

- METALLIZED BOPP CO-EX for dry lamination

**Application & Strength**

- Shiny metallized surface
- Good barrier; WVTR & O₂ TR
- Even optical density
- Develop low COF < 0.4 for high speed wrapping machine
B-41 METALLIZED BOPP COEX

- METALLIZED SURFACE
- TREATED LAYER
- CORE LAYER
- SEAL LAYER : (DEV) LOW COF
B-32 BOPP COEX PEARLIZED OPAQUE

BOPP Pearlized Opaque

Application & Strength

- For Packaging, Wrapping of short shelf life such as ice cream, chocolate bar, candies, cookies, and biscuit.
- High yield
- Low heat seal temperature
<table>
<thead>
<tr>
<th>Layer Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated Layer: For Printing</td>
</tr>
<tr>
<td>Core Layer: Cavitated Pearlized Opaque</td>
</tr>
<tr>
<td>Seal Layer</td>
</tr>
</tbody>
</table>
B52 BOPP WHITE

BOPP white plain film

Designed for decorative and industrial applications.

Application & Strength

• Excellent white pigment distribution, solid white & flatness.
• High Density
• The application can also be for Adhesive Tape, Gift Wrap, Flower Sleeves
B52 BOPP WHITE PLAIN

TREATED LAYER: FOR PRINTING

CORE LAYER: SOLID WHITE

SKIN LAYER
B-51 BOPP WHITE COEX

BOPP white coex film

Designed for printing & lamination applications.

Application & Strength

• Excellent white pigment distribution, solid white & flatness.
• High Density
• Low heat seal temperature
B-51 BOPP WHITE COEX

TREATED LAYER : FOR PRINTING

CORE LAYER : SOLID WHITE

SEAL LAYER
B-62b BOPP SYNTHETIC PAPER

- **BOPP Synthetic Paper**
  Paper looks for Bagging, Labeling, Overwrapping, Medical packaging replace Bleach Kraft paper

**Application & Strength**
- Strength of materials and water resistance can be substituted for Bagging, also to paper
- High yield *(density = 0.8)*
- Consistency on paper-like & white pigment
- Able to write on paper-like side
B-62b BOPP SYNTHETIC PAPER

TREATED LAYER: PAPER-LIKE

CORE LAYER: CAVITATED PEARLIZED OPAQUE

SKIN LAYER
Thank you for your attention