

## MPP 型电容器用双向拉伸聚丙烯薄膜

### BOPP film for capacitor type MPP

#### 1、特点 Characteristic

采用进口超高纯度电工级均聚聚丙烯树脂，经平膜法双向拉伸而成。具有厚薄均匀性好，机械强度高，电气性能优异的特点，卷制的电容器介质损耗小，绝缘电阻高。

普通型薄膜，耐温特性值为 70℃；准高温型薄膜，耐温特性值为 85℃；高温型薄膜，耐温特性值为 105℃。

It is stretched in biaxial orientation by means of flat film method by adopting imported high purity homopolymerized polypropylene resin in electrical. It is characterized by the followings, namely good thickness uniformity, high mechanical strength and excellent electric property. The capacitor made by this film has characteristics of small dissipation factor and high insulation resistance.


The ordinary film's characteristic value for heat resistance is 70 °C; the quasi high temperature type film's characteristic value for heat resistance is 85 °C and high temperature type film's is 105 °C.

#### 2、应用范围 Application

主要用于金属化膜电容器和箔式电容器，如交流电动机电容器、低压并联电力电容器、节能灯具电容器、混合动力汽车用电容器、直流电容器等。

It is mainly used in metallized - film capacitor and foil-film capacitor , such as AC motor capacitor, low-voltage parallel power capacitor, energy-saving lamps capacitor, capacitors for hybrid cars, DC capacitors and etc.

#### 3、薄膜尺寸规格 Size specification for MPP Film

| 规格 Size  |            |    | 3D   | 4D  | 5D  | 6D  | 7D  | 8D  | 9D  | 10D  | 12D  |
|--|------------|----|--|-----|-----|-----|---|-----|-----|------|------|
| 厚度<br>Thickness  | 重量法<br>WMV | μm | 2.8  | 3.8 | 4.8 | 5.8 | 6.8   | 7.8 | 8.8 | 9.8  | 11.8 |
|  | 机械法<br>MMV | μm | 3.0  | 4.0 | 5.0 | 6.0 | 7.0   | 8.0 | 9.0 | 10.0 | 12.0 |
| 平均厚度偏差 (WMV)<br>Average Thickness Deviation(WMV)         |            | %  | ±2%  |     |     |     | ±1%   |     |     |      |      |
| 成品膜卷宽度<br>Width of finished film roll                    |            | mm | 500±2, 620±2 或根据客户需求进行分切<br>500±2, 620±2 or cutting according to customers |     |     |     |   |     |     |      |      |
| 内径 (D <sub>0</sub> )<br>Inner Diameter (D <sub>0</sub> ) |            | mm | Φ76.2、Φ152.4   |     |     |     |  |     |     |      |      |
| 外径 (D)<br>Outer Diameter (D)                             |            | mm | Φ420~Φ600  |     |     |     |   |     |     |      |      |

注：特殊规格另行协商

**Note: Special specifications will be discussed separately**

#### 4、厚度表示方法 Representation method of thickness

薄膜厚度的标称值用薄膜厚度中心值（整数，如 3、7、10、15...）加尾数（小数点后一位）或其代码表示。本公司 MPP 膜厚度标称值为重量法厚度（WMV）；RPP/RRPP 膜厚度的标称值为机械法厚度（MMV）（十层法）。

The nominal value of the film thickness is indicated by the central value (integer value, such as 3, 7, 10, 15.) of film thickness plus mantissa (one point after decimal point) or its code. Our nominal value for MPP film thickness refers to WMV, the nominal value for RPP/RRPP film thickness refers to MMV (ten layer method).

| Number | Letter | Number | Letter |
|--------|--------|--------|--------|
| -0.4   | B      | +0.1   | V      |
| -0.3   | C      | +0.2   | W      |
| -0.2   | D      | +0.3   | X      |
| -0.1   | E      | +0.4   | Y      |
| 0      | L      | +0.5   | Z      |

示例：MPP8D 表示 WMV 厚度为 7.8μm；RPP12L 表示 MMV 厚度为 12.0μm

Examples: MPP8D represents film thickness in WMV is 7.8μm; RPP12L represents film thickness in MMV is 12.0μm

### 5、技术特征（典型值） Technical features (typical value)

| 项目 Item  | 单位 Unit           | 典型数值 Typical Values   |            |           | 测试标准 Testing Standard    |                      |
|--|-------------------|-----------------------|------------|-----------|--------------------------|----------------------|
|  |                   | 普通型 MPP01             | 准高温型 MPP02 | 高温型 MPP03 |                          |                      |
| 密度 Density   | g/cm <sup>3</sup> | 0.905±0.005           |            |           | GB/T 13542.2-2009/11     |                      |
| 熔点 Melting Point                                   | °C                | 168±2                 | 170±2      | 172±2     | GB/T 13542.2-2009/23     |                      |
| 拉伸强度 Tensile Strength                              | 纵向 MD             | MPa                   | 150        | 155       | 160                      | GB/T 13542.2-2009/11 |
|  | 横向 TD             | MPa                   | 250        | 280       | 300                      | GB/T 13542.2-2009/11 |
| 断裂伸长率 Elongation at break                          | 纵向 TM             | %                     | 140        |           | GB/T 13542.2-2009/11     |                      |
|  | 横向 TD             | %                     | 50         |           | GB/T 13542.2-2009/11     |                      |
| 弹性模量 Elastic Modulus                               | 纵向 MD             | MPa                   | 2500       | 2600      | 2800                     | GB/T 13542.2-2009/11 |
|  | 横向 TD             | MPa                   | 3200       | 3600      | 4000                     | GB/T 13542.2-2009/11 |
| 热收缩率 Thermal Shrinkage                             | 纵向 MD             | %                     | 3.5        | 3.2       | 2.8                      | GB/T 13542.2-2009/23 |
|  | 横向 TD             | %                     | 1.0        | 0.8       | 0.6                      |                      |
| 浸润张力 Wetting Tension                               | mN/m              | 38                    |            |           | GB/T 13542.2-2009/10     |                      |
| 表面粗糙度 Surface Roughness                            | μm                | 0.10±0.02             |            | 0.08±0.02 | GB/T 13542.2-2009/8      |                      |
| 介电强度（平均值） BDV(DC) (Average)                        | V/μm              | 600                   |            |           | GB/T 13542.2-2009/18.2.2 |                      |
| 摩擦系数（静/动） Coefficient of Friction (Static/Sliding) |                   | (0.7—0.9) / (0.6—0.8) |            |           | GB/T 10006-1988          |                      |
| 相对介电常数   |                   | 2.2                   |            |           | GB/T 13542.2-2009/17.1   |                      |

|  |     |                      |                        |
|--|-----|----------------------|------------------------|
| Relative Permittivity                  |     |                      |                        |
| 体积电阻率<br>Volume Resistivity            | Ω.m | >10 <sup>15</sup>    | GB/T 13542.2-2009/16.1 |
| 介电损耗因素<br>Dielectric Dissipation Fator |     | 2.0×10 <sup>-4</sup> | GB/T 13542.2-2009/17.1 |

◆ 以上参数非技术协议，

仅供参考

The above parameters are non-technical agreement, for reference only.

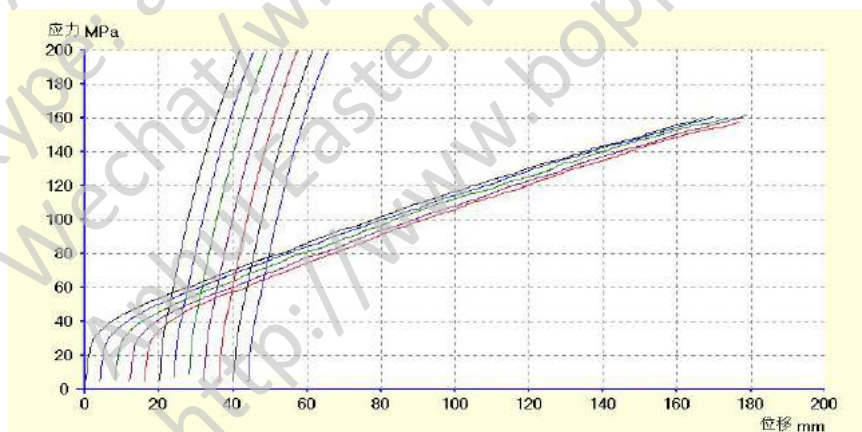
## 6、电弱点 Electrical Weakness Point

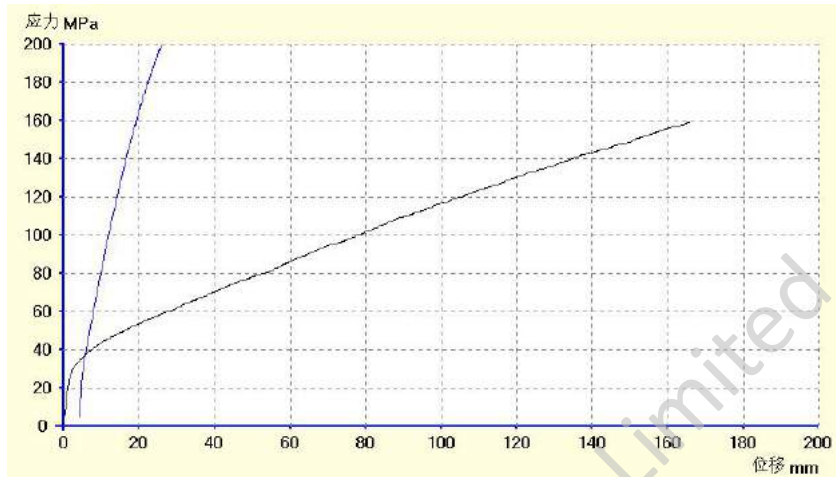
| 标称厚度 (um) Nominal Thickness (um) | 电弱点数 (个/m <sup>2</sup> ) Number of Electrical Weakness Point<br>300V/μm |
|----------------------------------|---|
| ≤4                               | ≤1.0  |
| 5                                | ≤0.8  |
| 6                                | ≤0.7  |
| 7                                | ≤0.6  |
| 8                                | ≤0.4  |
| 9                                | ≤0.3  |
| ≥10                              | ≤0.2  |

## 7、化学特性 Chemical Properties

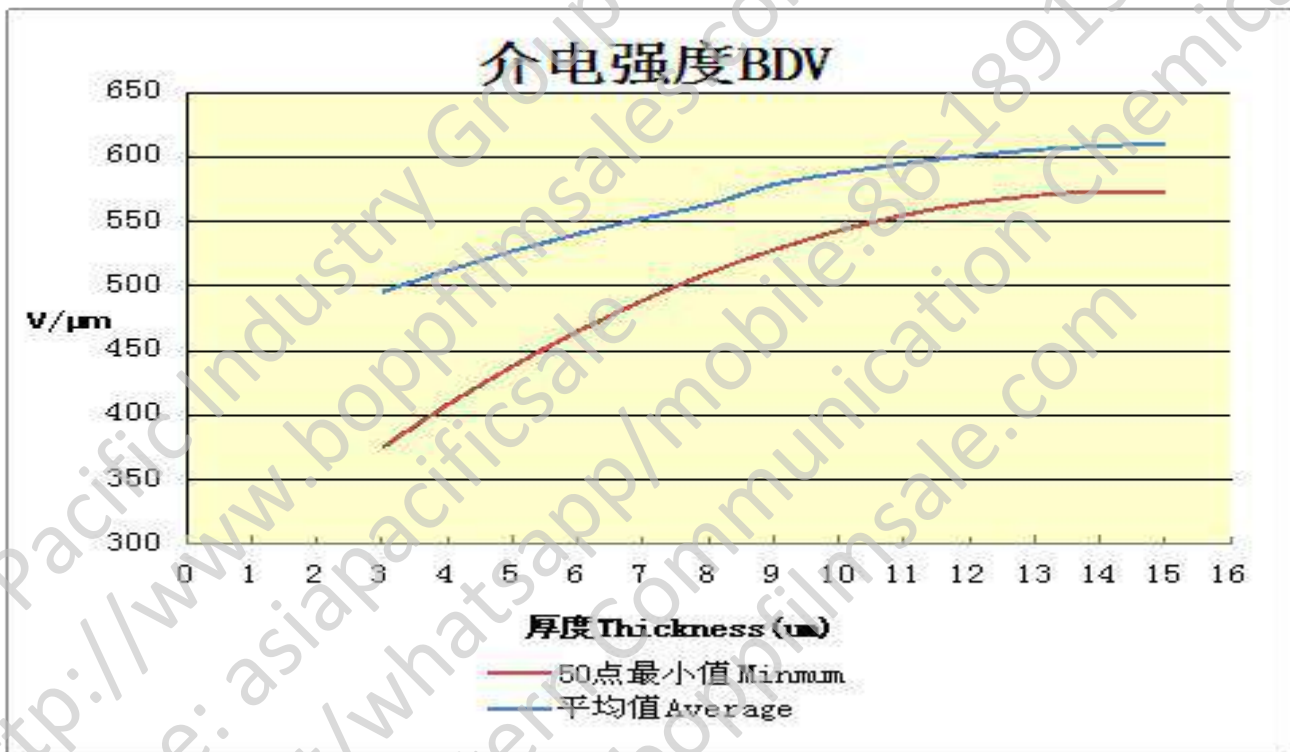
|                      |        |
|----------------------|--------|
| 灰分 Ash Content       | <30ppm |
| 氯含量 Chlorine Content | <10ppm |
| 水含量 Water Content    | <50ppm |

## 8、拉伸强度曲线 Curve of Tensile Strength





9、介电强度和薄膜厚度关系曲线 Curve of the Relativity of BDV and Film Thickness



10、包装 Packing

每一卷薄膜在分切和检验之后都会用聚丙烯塑料袋进行包裹，以便隔离粉尘和颗粒。膜卷两侧使用泡沫垫片、支撑夹板、堵头进行固定，防止运输过程中膜卷受到挤压。并用纸箱包装、打包、托盘堆垛。托盘的尺寸有：1140\*1140、1100\*700。堆垛好纸箱缠绕上塑料薄膜，以再次隔绝粉尘、颗粒和水汽。

Each roll of film after slitting and inspection should be wrapped with polypropylene plastic bags to protect against dust and foreign particles. The film roll is also fixed with foam gasket, support plate and plug on both sides of the roll and packed with carton box to prevent rolls from being squeezed in the process of transportation. Each packaging should be tied with plastic straps

and stacked in two or three layers on wooden pallet. Each stack is wrapped with stretch film. Standard pallet sizes are: 1100\*700 and 1040\*1040.

### 11、儲存 Storage and the roll should not be stored for long time.

膜卷在儲存過程中應該避免任何形式的衝擊；儲存環境應該保持乾燥，環境溫度不應高於 30°C；並且膜卷不宜儲存太長時間，否則會影響薄膜的使用性能；建議儲存時間不超過 1 年，如儲存時間超過 1 年，應該對膜卷的各項性能重新進行評估。

All kinds of vibration and shocks should be avoided to the film rolls in the process of storage and transportation. The rolls should be stored not more than one year in a dry place. Temperature exceeding 30° C should be avoided during transport and storage. If the film is stored for more than one year, the film properties should be evaluated again.

### 12、標籤 Labelling

每一卷膜在包裝箱裏面和包裝箱上都有一張有關膜卷基本信息的標籤，如圖：

Each roll is equipped with two labels, which are placed on the outer surface of the carton packaging and inside the packaging.

| BOPP Film for Capacitor         |  |                  |
|---------------------------------|--|------------------|
| 編號 152534101<br>Roll-NO.        | 型號 MPPO3<br>Film-Type                            |                  |
| 厚度 (um) 7B<br>Nominal thickness | 寬度 (mm) 620<br>Width                             |                  |
| 長度 (m) 22500<br>Length          | 接頭數 0 接頭位置 (m)<br>Number and position of connect |                  |
| 重量 (kg) 82.0<br>Weight          | 電暈處理面 外 outside<br>Corona treated side           |                  |
| 卷芯內徑 (mm) 76<br>Core diameter   | 等級 優等品<br>product Class                          | 檢驗 04<br>checker |
| 班次 甲<br>Shift and team          | 生產日期 2015 年 8 月 11 日<br>Date of production       |                  |

上述標籤的有關信息 Information on the label

152534101: 代表膜卷編號 complete customer roll number, where;

-15 代表生產年份是 2015 年 the year of production is 2015

-2534 代表大膜卷編號 Production lot number

-101 代表小膜卷分切的號位 Roll position (i.e. position in TD direction in a slitting set)

MPP03: 代表薄膜的類型 The type of the film, where

-MPP01 代表普通膜 Ordinary film

-MPP02 代表准高溫膜 Quasi high temperature film

-MPP03 代表高溫膜 High temperature film

7B: 代表標稱厚度 (重量法) Nominal thickness of the film (by weight)

620: 代表膜卷的宽度 the width of film roll

22500: 代表膜卷的长度 the length of film roll (m)

0: 代表该膜卷的接头个数 Number of connecting joints of film break

82.0: 代表该膜卷的重量(kg)Net weight of the film in the roll (kg)

内/外: 代表电晕处理面的位置 The position of corona treated side (outside/inside)

76/152: 代表纸卷芯的内径 The core diameter (76or152mm)

优等品: 代表该膜卷的等级 The class of the film roll (F/Q)

04: 代表该检验该膜卷的检验员代号 the number of checker

甲: 代表分切该膜卷的班组 shift number of slitting team

2015年8月11日: 代表生产该膜卷的日期 Product date-year/month/day