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|-----------------------------------------------------------------------------------|----------------------------------|-----------------|
|  | <b>Dissipative ESD Materials</b> | Edition 1       |
|                                                                                   | <b>Technical Data sheet</b>      | Serie: 20220706 |

**Application:** Dissipative ESD Materials are dedicated to protect sensitive to static electricity discharge electronic devices and components in EPA zones. Dissipative ESD materials meets the surface resistance conditions  $R_s < 1 \times 10^{11} \Omega$  specified in the norm DIN EN 61340-5-3 at relative humidity  $RH > 50\%$ ; according with RoHS and REACH norms

**Features:**

- The Material is dedicated to protect ESDS products against electrostatic discharge in EPA;
- The material is suitable for sealing;
- Recyclable Material;

**General properties**

| Properties                                     | Parameters                                                                                                                                        |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Material</b>                                | Amine free, Electrostatically polyethylene dissipative LDPE ESD, silicon free, Silica Free                                                        |
| <b>Recycling sign/ number</b>                  |                                                                |
| <b>Possible Product Types</b>                  | * Bags (Open Top / Zip Lock / with Lap and adhesive tape / Gusset Bags / 3D Bags – Square bottom<br>* Sleeve / Half sleeve / Tape                 |
| <b>Raw material production method</b>          | Blow molded LDPE                                                                                                                                  |
| <b>Foil Colour</b>                             | Pink Transparent                                                                                                                                  |
| <b>Using place</b>                             | Zone EPA                                                                                                                                          |
| <b>Overprint/ Colour</b>                       | ESD + recycling sign + LOT (Mfg date) “mm/yyyy” + Individual Customer LOGO if required. Black colour. Multiple print or only One print on the bag |
| <b>According with the norm</b>                 | PN-EN (IEC) 61340-5-1                                                                                                                             |
| <b>Size</b>                                    | Under the Customer requirements / Custom sizes                                                                                                    |
| <b>According with directive RoHS and REACH</b> | SGS raport nr. TR1698734                                                                                                                          |
| <b>Guarantee <sup>(1)</sup></b>                | 2 years                                                                                                                                           |
| <b>Production Method</b>                       | The Bags can be produced with 1 bottom / 2 sided or 2&3 seals                                                                                     |

## Physicochemical and mechanical properties <sup>(2)</sup>

| Properties                                     | Test Methods            | Unit | Typical value <sup>(3)</sup>                                                        |
|------------------------------------------------|-------------------------|------|-------------------------------------------------------------------------------------|
| Thickness                                      | MB/MW/03<br>PN-ISO 4593 | µm   | 25-200 µm                                                                           |
| Size tolerance                                 | PN-ISO 4593             | mm   | ±5 - ±70 mm<br><i>Depends on the different type of product and size</i>             |
| Thickness tolerance                            | PN-ISO 4593             | mm   | ±0,005mm - ±0,01mm<br><i>Depends on the different type of product and thickness</i> |
| Surface resistance ***                         | IEC 61340-2-3           | Ω    | $10^4 - 10^{11}$                                                                    |
| Surface resistivity for Dissipative Materials  | IEC61340-5-1            | Ω/sq | $10^9 \leq \lambda < 10^{11}$                                                       |
| Density                                        | IEC 61340-5-1           | g/cm | 0,92g/cm                                                                            |
| Discharge ( 1000V/100V )                       | IEC 61340-5-1           | s    | <2s                                                                                 |
| Tensile strength <sup>(4)</sup>                | ISO 527-1,2             | MPa  | 13                                                                                  |
| Tensile strain at break (MD/TD) <sup>(5)</sup> | ISO 527-1,3             | %    | 540/600                                                                             |
| Dart/Drop <sup>(5)</sup>                       | ISO 7765-1 method A     | g    | 140                                                                                 |
| Tensile strength (MD/TD) <sup>(5)</sup>        | ISO 527 -1,3            | MPa  | 22/22                                                                               |

(1) Environmental conditions : Humidity above 50% and Temperature 23°C (Conditioning >48 hours) + Typical conditions of Transport and Storage

(2) Properties were studies on sample dissipative material ESD;

(3) Theoretical calculations

(4) Typical properties measured on standard injection moulded test specimen according to ISO 294-1

(5) Film properties tested using 50µm thick blown film extruded at melt temperature of 180 °C and a blow up ratio 2.5:1

