

PELECTRON UC

Preface

PELECTRON UC is a block-type thermoplastic elastomer composed of hydrophilic and hydrophobic segments. PELECTRON UC imparts permanent antistatic property to thermoplastic resin without depleting the physical properties and moldability of the resins themselves.

Typical Properties

	Values	Remarks
Appearance	Pale yellow pellet	
Melting Point	ca. 156°C	DSC, ASTM D 3418
Melt Flow Rate	ca. 15g	10 min, ASTM D 1238 (190°C, 21.18N)
Thermal Degradation Temperature	ca. 250°C	1)
Surface Resistivity	ca. $6 \times 10^6 \Omega/\text{sq.}$	ASTM D 257

1) The lowest temperature at which PELECTRON UC begins thermally to degrade.
(measured under air atmosphere with a thermal gravimeter)

General Procedure

As shown in Figure 1, after PELECTRON UC and thermoplastic resin are dry-blended using a blender etc., they are kneaded and pelletized using a twin screw extruder etc. Dispersant, filler and pigment may be added as necessary during the dry-blending or the kneading process.

Pellets are then molded into the final product using an appropriate molder, such as an injection molding machine.

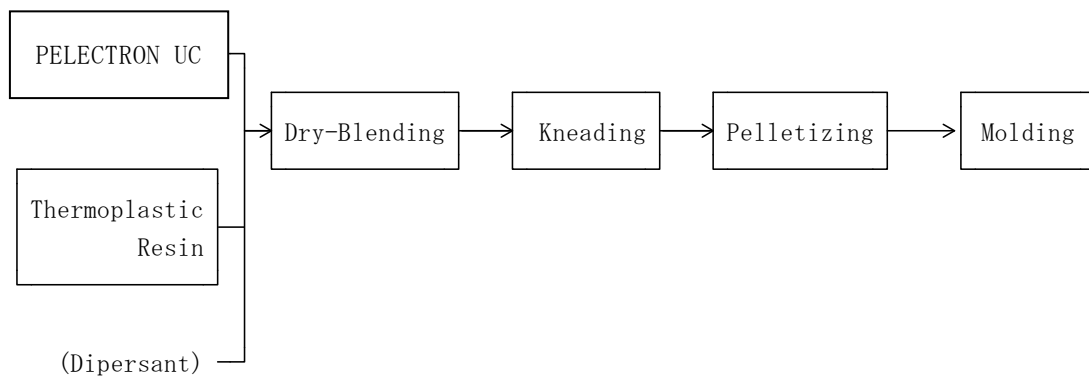


Figure 1. General Procedure for Injection Molding of PELECTRON UC

Performance Tests

Following is example result of performance test on PP resin mixed with PELECTRON UC.

1. Relation between Amount of PELECTRON UC Added and Resultant Surface Resistivity

Addition of PELECTRON UC to PP resin makes the resin highly antistatic. Determine optimal amount according target surface resistivity, with reference to Figure 2.

2. Influence of Water Washing on Surface Resistivity (Evaluation of Antistatic Effect Durability)

PP resin mixed with PELECTRON UC hardly changes in surface resistivity, remaining antistatic even if washed in water. In contrast, PP resin mixed with conventional Blend-type low molecular weight antistatic agent loses its antistatic property when water-washed about three times.

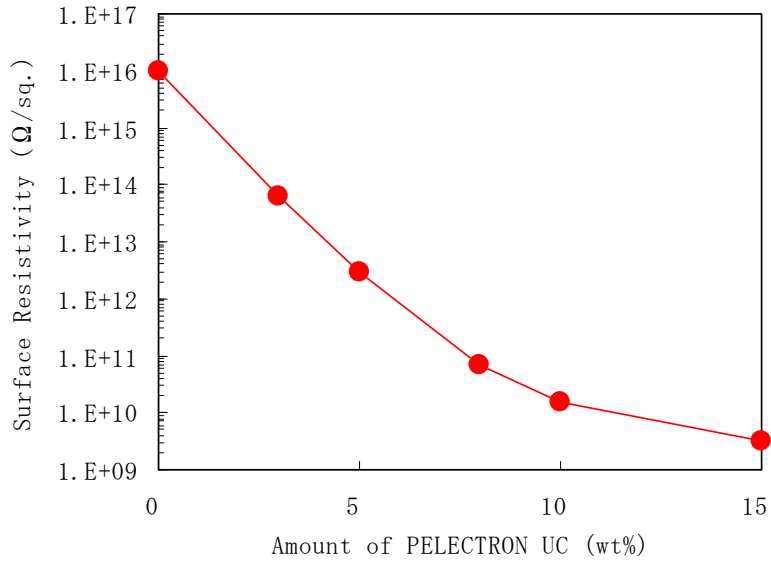


Figure 2. Relation between PELECTRON UC Antistat added and Resultant Surface Resistivity (23°C, 50%RH/PP resin)

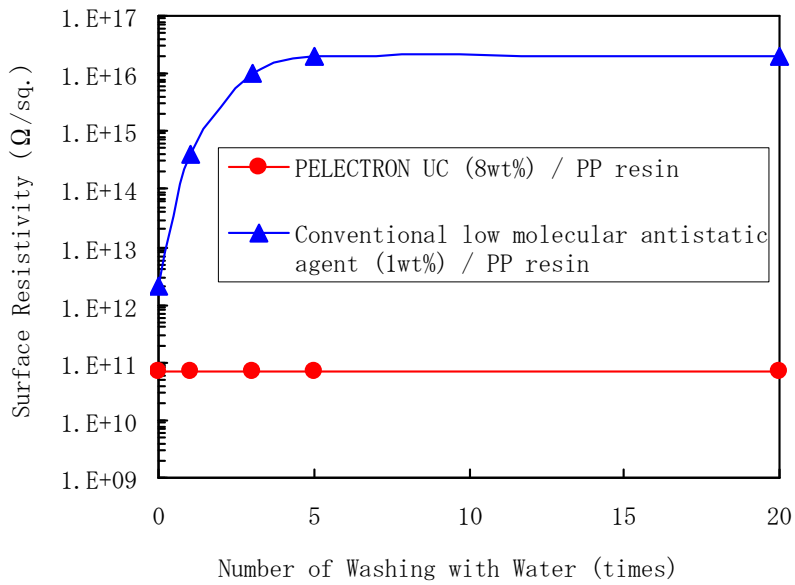


Figure 3. Influence of Water Washing on Surface Resistivity

3. Physical Properties of PP resin

The addition of PELECTRON UC to PP resin minimally affects the resin physical properties.

Table 1: Addition of PELECTRON UC and Resultant Physical Properties

	Method (ASTM No.)	PELECTRON UC (15 wt%) /PP resin	PP resin
Surface Resistivity Ω /sq.	D257	10^9	$>10^{16}$
Tensile Strength MPa	D638	24	26
Flexural Modulus MPa	D790	960	1110
Izod Impact Strength kJ/m ² (notched)	D256	10	11

Materials and Methods

Materials.

PELECTRON UC (15 wt%) / PP resin

Specified amounts of PELECTRON UC and PP resin were dry-blended and kneaded with a twin screw extruder at approx. 220°C. The kneaded compound was then molded with an injection molding machine (nozzle temperature: approx. 220°C, mold temperature: approx. 50°C) into test pieces 2 mm in thickness.

PP resin

The PP resin was molded under the conditions shown above.

Methods.

Surface Resistivity

The test pieces were kept at 23°C under 50%R.H. for 24 hours. Surface resistivity was measured with a megohmmeter.