EPTP-P-08.- Sheett Extrusion.

Background

This document presents standard practice to extrude sheet from either flake or pellets. The test material will be extruded into sheet at a level of 25% (or dully assessed market %) blended with control material. The sheet thickness to be produced should be 400 microns+/- 5%. The control material will be used to set-up and adjust the equipment and produce samples required for testing. The test sample should be processed under the identical conditions of the control. If this is not possible, then any changes made should be documented.

The rPET-to-Sheet evaluation program is designed to show processing and un-oriented sheet performance differences between a control material and that control material containing recycle-content Innovation material. It is a ***comparative*** study that does not rely on the final sheet meeting absolute performance criteria.

Practice Summary

Sample flake or pellets from each sample to be extruded into sheet with a target thickness of 400 microns+/- 5%. The width of the sheet produced is not critical and can vary based upon the equipment being used. Samples of the extruded sheet will be visually evaluated for black specks, particulates or gels, and tested to meet impact guidance criteria.

Equipment Required

- Lab or small-scale sheet extrusion machine
- Suitable take out chilled roll stacks

Materials and Reagent Required

- Flake or pellets made from control material.
- Flake or pellets made from test material.

Practice Steps

1. Dry the control and test flake or pellet samples separately in a desiccant dryer capable of achieving a moisture content of less than 50 ppm for the PET pellets dried in the unit at 160° C.
2. Starting with the control flake or pellet samples, develop the extrusion process parameters using standard process temperatures of 260° C to 302° C.
3. Extrude through a melt filter 40/150/40 mesh screen pack.
    a) This represents minimum filtration level currently used for sheet extrusion
    b) Processing conditions should be the same for control and test samples.
    c) In the event of a process change, it is required to record this change.

Note 1: If the small lab scale equipment is unable to process the standard grind flake samples, it is permissible to perform a second grind through a 4mm screen insuring that all ground material is captured for the study and there is no loss of the Innovation being studied through static cling to the grinder or screen.

Note 2: If pellets are used to make sheet that have been obtained following PET-P-06, the melt filtration step at 40/150/40 mesh can be eliminated as they have already been melt filtered to a higher extent.

4. The following processing characteristics should be monitored and reported
    a) Extruder amps (maximum difference +10% difference)
    b) Melt drop between die and roll stack nip (no die drool or blowouts)
    c) Bank stability (no substantial change)
    d) Fuming (no increase)
    e) Roll plate out (no increase)
    f) General sheet optical quality (no substantial visual difference)

Inspection Characteristic	Testing method	Units	Acceptation criteria
Color L,a,b	Delta CIELAB	DE	< 2
Haze	ASTM D1003	%	≤ 7%
Black spots (≥ 0,25mm^2 – ≤ 1mm^2)	OCS (or alternative visual inspection system)	units/10m^2	≤ 8
Black spots (> 1mm^2)	OCS (or alternative visual inspection system)	units/10m^2	≤ 2
Gels (> 1mm^2)	OCS (or alternative visual inspection system)	units/10m^2	≤ 50
Tensile Impact	ISO 8256	kJ/mm^2	> 200
Tensile Strength at yield	ISO 527-3	N/mm^2	45 - 65
Elastic Modulus	ISO 527-3	MPa	1800 - 2200

DOCUMENT REVISION HISTORY

Version	Publication Date	Revision notes
V0	Sept - 21	NEW DOCUMENT