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Plastics - Recycled plastics - Determination of solid contaminants content

Plastiques - Plastiques recyclés - Détermination de la teneur en contaminants solides

Kunststoffe - Rezyklate - Bestimmung des Gehaltes an Feststoffverunreinigungen

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (CEN/TS 17627:2021) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

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Introduction

The use of recycled materials in production of plastics products is widely accepted nowadays throughout the industry. Those recycled materials are mostly prepared from post-industrial or post-consumer sources, which always contain more or less contamination by foreign bodies. Most of this contamination is removed during the recycling process, either by washing and/or by melt filtration. However, this removal is never perfect, leaving some small amounts of foreign bodies in the material pellets.

For many applications that use recycled materials this little residue of contaminants is not posing any problem. But for other, more demanding or more sensitive products (e.g. having thin wall sections) the use of a recycled material is not an option, unless the number and size of those solid contaminants could accurately be determined and controlled.

While some recyclers do have the means to determine and report a limited number of properties of their material, like density, MFI etc., none of them is able to measure or specify anything regarding the amount and size of foreign bodies left in the material that they supply.

This document describes a test method that enables the determination of the number, the size and the substance (material) of solid contaminants in a sample of recycled material, using a small extruder and a microscope. This test method, known as **SCF** (for **Solid Contaminants Filtration**), was developed by a major user of recycled polyethylene and has since been in use almost daily for more than 10 years.

Although the experience gained so far with this test method is mainly with polyethylene materials, it is believed that this method can be adapted and used for testing other thermoplastic materials.

1 Scope

This document specifies a method for determination by melt filtration of solid contaminants content in a sample of recycled thermoplastic material, evaluating their number and, optionally, their size and substance (material).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CEN/TS 16010, *Plastics — Recycled plastics — Sampling procedures for testing plastics waste and recyclates*

CEN/TS 16011, *Plastics — Recycled plastics — Sample preparation*

ISO 9044:2016, *Industrial woven wire cloth — Technical requirements and tests*

ISO 9045, *Industrial screens and screening — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9045 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

4 Principle

The material sample, normally in pellet form, is passed through an extruder fitted with a screen pack, followed by clear, uncoloured virgin material. Then the extruder is stopped, the screen pack is taken out and pressed flat. The screen pack is examined under a microscope for presence and evaluation of any solid contaminants embedded in a thin layer of transparent material on the screen surface.

5 Apparatus and consumables

5.1 Extruder

A small, single-screw extruder, having screw diameter preferably between 18 mm and 30 mm, with a breaker plate dimensioned to contain, and to enable tight clamping and complete sealing of, the screen pack specified in 5.5.

Recommended: a convenient clamping/unclamping arrangement for the breaker plate that enables quick and easy change of the screen pack.

NOTE Optional: a melt pressure sensor located just in front of the screen pack. A sharp and steady increase in melt pressure while passing the tested material in the extruder is a pre-warning sign of high contamination in the sample.