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Plastics — Ecotoxicity testing scheme for soluble decomposition intermediates from biodegradable plastic materials and products used in the marine environment — Test methods and requirements

Plastiques — Méthodes d'essai d'écotoxicité pour les intermédiaires de décomposition solubles à partir de matériaux et produits plastiques biodégradables utilisés dans le milieu marin — Méthodes d'essai et exigences

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Foreword

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This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 14, *Environmental aspects.*

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Introduction

There is a growing interest in using biodegradable materials in products used in the marine environment (e.g. farming and fishing gears, floats, buoys and other non-fishing materials or products). These products are subject to wear and tear and, therefore, tend to be sources of macro- and microplastics. Biodegradability is a factor that, in principle, mitigates the environmental impacts of fragmentation, thanks to persistence times in the environment that are shorter than that of non-biodegradable materials. Therefore, test methods to measure the level of biodegradation and disintegration of plastic materials in different marine habitats have been established by ISO/TC 61/SC 14 in recent years to better characterize the degradation of plastics in these very particular environments:

— The test standards like ISO 18830 (or ISO 19679), ISO 22404, ISO 23977-1 (or ISO 23977-2) are suited to investigate the biodegradation of plastic materials exposed to marine environmental samples (sediments and seawater).

— The ISO standard specification ISO 22403 specifies test methods and requirements to assess the intrinsic biodegradability of materials exposed to marine inocula under mesophilic aerobic laboratory conditions.

— The ISO standard ISO 22766 describes methods for the determination of the degree of disintegration of biodegradable plastic materials exposed to sublittoral and eulittoral habitats under real field conditions.

— The ISO standard ISO 23832 describes methods for the determination of the degradation rate and disintegration degree of plastic materials exposed to marine environmental matrices under laboratory conditions.

Besides data on the biodegradability of plastics materials, tests on ecotoxicological effects of potential soluble decomposition intermediates of the biodegradation process to marine organisms are necessary to enable developer and manufacturer of materials to evaluate and to exclude negative effects on marine organisms. In addition, in combination with data on biodegradability, data on ecotoxicological effects can be used for e.g. risk assessment purposes.

This document specifies test methods and requirements for assessing potential adverse effects on different marine organisms caused by soluble decomposition intermediates (degradation products) resulting from the decomposition of plastic materials that are intentionally used in marine areas.

Comprehensive ecotoxicity testing schemes and evaluation criteria are already part of ISO standard specifications like ISO 17088 and ISO 23517. The scheme and criteria given in ISO 23517 are equivalent to the requirements specified in the CEN-standard EN 17033. The CEN-document EN 17427 on carrier bags suitable for treatment in well-managed home composting installations includes an ecotoxicity testing scheme that follows the same basic principles as laid down in above mentioned ISO- and EN-standard specifications: adverse effects are assessed based on results from three tests covering organisms representing different trophic levels.

This document aims to provide a suitable ecotoxicity testing scheme for marine organisms.