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BSI Standards Publication

Safety of toys — Categorization of slime type materials

bsi.

National foreword

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A list of organizations represented on this committee can be obtained on request to its committee manager.

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European foreword

This document (CEN/TS 17973:2023) has been prepared by Technical Committee CEN/TC 52 “Safety of toys”, the secretariat of which is held by DS.

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Introduction

There have been long lasting discussions on the correct categorization of slime type products in conjunction with testing those products according to EN 71-3 and the applicability of the correct limit value.

Due to their complex behaviour, in many cases a clear distinction cannot be made easily to come to a reliable conclusion on category 1 (pliable) or category 2 (liquid).

As they often present non-Newtonian behaviour on the one hand and/or are creeping rather than free flowing on the other hand the determination of the status appears complex. The stickiness of some compositions needs to be evaluated in a specific way and presents a further challenge.

According to Annex II, Chapter 3, Paragraph (13), the Toy Safety Directive 2009/48/EC differentiates 3 material categories, which are derived on a risk basis from, besides other facts, (*inter alia* RIVM report 320003001/2008 [incl. erratum]) an assumption of daily values for ingestion: category 1 - 100 mg toy material per day/category 2 - 400 mg toy material per day. This was confirmed by SCHER - Final Opinion on Estimates of the amount of toy materials ingested by children as of 8 April 2016, ISBN 978-92-79-ND.

Hand-to-mouth contact (addressing residues on the hands/fingers) is yet addressed within the mentioned RIVM report and therefore addressed by the given limit values. In this conjunction sticky should mean “visible product residues” on fingers and hands (wet feeling does not necessarily reflect the intake of toy material).

For slime-like products, such as toy slime (free-flowing), effect slime (creeping slime masses) and kneading slime (quasi-stable pliable compounds), 2 possible categories come into consideration:

— Category 2: liquid or sticky toy material;

— Category 1: dry, brittle, powder-like or pliable toy material.

Some test institutes as well as market surveillance authorities tend to categorize more conservative into category 2 because of a potentially higher level of protection which leads to different evaluations. This may be not proportionate from the TSD perspective.

The purpose of this document is to give some clarification on slimes and their behaviour, methodology for the characterization as well as an approach for a suitable categorization.

Besides various elements, the element boron is of particular interest for slime-like products which usually obtain their special (non-Newtonian) properties (such as rheopectic or thixotropic behaviour) through the cross-linking of organic components (binders) with the element boron.

For category 1, the migration limit for boron is 1 200 mg/kg toy mass, for category 2 the migration limit is set to 300 mg/kg.

In the context of conformity assessment, it is of particular importance to categorize the slime-type materials correctly for a well-founded evaluation of the test results on the applicable limit value.

Request for a test method proposal

The test method should be easy to use and show acceptable precision for decision making. It must also be pragmatic and may be based on a convention.

1 Scope

This document specifies a test method for categorization of slime-type products to support users of EN 71-3 in the categorization of products with slime-like behaviour into material categories 1 (dry, brittle, powder-like or pliable toy material) or 2 (liquid or sticky toy material).

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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

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

3.1
slime
liquid, semi-liquid or firm material exhibiting free flowing, viscous, paste-like up to creeping behaviour presenting non-Newtonian properties (like rheopexy or thixotropy) and changing the shape over a certain time when left alone

3.2
liquid
free flowing fluid presenting Newtonian behaviour, not keeping any defined shape when not kept in a container

3.3
modelling clay
putty
pliable material exhibiting kneadable behaviour (soft to firm) keeping the shape after manipulation

3.4
creeping
slow steady flow of a viscous material under low stress conditions commonly understood as a specific viscoelastic property

4 Theory

4.1 Historical methods

4.1.1 General

Due to the non-Newtonian behaviour of slime-type products, the standard measurement methods for viscosity are not suitable to obtain reliable results for the categorization.

Furthermore, there is no clear range or point for decision making.

Known provisional methods need mechanical manipulation of the material in preparing the sample for measurement.