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XXXIX. Commodities Based on Polyurethanes

As of 01.01.2012

There are no objections to the use of polyurethanes in the manufacture of commodities in the sense of § 2, Para. 6, No 1 of the Food and Feed Code (Lebensmittel- und Futtermittelgesetzbuch), provided they are suitable for their intended purpose and comply with the following conditions:

1. Preamble

Most articles or coatings made of polyurethane¹ do not come into direct contact with foodstuffs with their entire surface area or over prolonged periods of time, but usually with just a part of their surface for a limited time. Depending on the different uses to which they are put in practice, commodities made of polyurethane are divided into three categories:

prolonged contact,
medium contact and
short contact.

In order to characterise the different categories, examples of the commodities placed in each are given below.

2. Substances used to manufacture commodities from polyurethanes

The use of starting materials is subject to the Commission Regulation (EU) No 10/2011.

The evaluation presented in the following refers to polymers from the following monomeric starting substances:

Category 1:

Adipic acid

Carbonic acid (from diphenyl carbonate)

1,2-Ethanediol

1,2-Propanediol

Glycerol

1,6-Hexanediol

1,4-Butanediol

2,2-Dimethylpropanediol

Diethyleneglycol

as well as polyesters with terminal hydroxy groups produced from the diols and acids listed above as far as they are covered by the positive list of the Commission Regulation (EU) No 10/2011

Polyethers based on ethylene oxide, propylene oxide, and/or tetrahydrofuran with free hydroxy groups as far as they are covered by the positive list of the Commission Regulation (EU) No 10/2011

Hexamethylene-1,6-diisocyanate

Diphenylmethane-2,4'-diisocyanate

Diphenylmethane-4,4'-diisocyanate

¹ Polyurethanes are polymers formed through polyaddition reactions of bi- or multi-functional isocyanates with substances with one or more active hydrogen atoms.

2,4-Toluene diisocyanate

2,6-Toluene diisocyanate

2,4-Toluene diisocyanate dimer

Category 2 and 3:

The following substances may be used additionally to the substances listed in category 1:

Castor oil

Naphthylene diisocyanate

Additives permitted by the Commission Regulation (EU) No 10/2011 may be used in compliance with the restrictions laid down therein. In addition to these, the additives listed for the particular categories may also be used. For Category 1 commodities only substances included in the basic list may be used. For Categories 2 and 3 additional additives are given.

2.1 Category 1

2.1.1 Definition:

The intended use of commodities in this category brings them into contact with foodstuffs for periods longer than 24 hours.

Examples:

1. Storage containers
2. Container linings
3. flat seals/gaskets
4. Packaging material

2.1.2 Basic list of substances that may be used

2.1.2.1 Starting materials

see remarks above

2.1.2.2 Accelerators:

Iron acetylacetonate, max. 0.01 %

Dimethyl-tin-dineodecanoate, max. 0.12 %

2.1.2.3 Organic and inorganic coloured pigments, provided they do not transfer to foodstuffs²

2.2 Category 2

2.2.1 Definition:

The intended use of commodities in this category brings them into contact with food for periods of max. 8 hours.

Examples:

1. Hoses (tubing) for conveying foodstuffs
2. All sorts of coatings (e.g. for conveyer belts or (cream) piping bags)

2.2.2 The substances named in the basic list (2.1.2), and the concentrations given there, also apply for Category 2 commodities.

2.3 Category 3

2.3.1 Definition:

- a) The intended use of commodities in this category (compare 2.3.2) brings them into contact with foodstuffs for periods of no more than 10 minutes (short contact).

Examples:

² Recommendation IX. "Colorants for Plastics and other Polymers Used in Commodities".

1. roller coatings
 2. moulds for chocolate or chocolates
 3. protective screens and chutes
 4. Sleeves on bottling machinery
- b) Commodities (articles and materials) which only come in contact with dry foodstuffs are also placed in this category.
- Examples:
1. Coatings and covers for grain silos
 2. Conveyor belts for dry foodstuffs
 3. Scrappers for flour sieves
also
 4. Large containers (storage containers) and the like, that come into contact with dry foodstuffs sometimes over prolonged periods of time, but only for use in industry.
- For packaging material, used for example in the form of films or bags for packaging dry foodstuffs, the requirements for Category 1 commodities alone are applicable.
- 2.3.2 Substances that may be used in addition to those contained in the basic list
The substances named under 2.1.2 und 2.2.2 and the concentrations given there, also apply for the manufacture of Category 3 commodities.
In addition to the substances listed under 2.1.2 and 2.2.2, the following may also be used:
- 2.3.2.1 Emulsifying agents³:
N-(2-aminoethyl)-3-aminopropane sulfonate and/or N-(2-aminoethyl)-2-amino-ethane sulfonate, in total max. 5.0 %
- 2.3.2.2 Cross-linking agent, in total max. 3.0 %:
Dicumyl peroxide
Cumyl-tert-butyl peroxide
 α,α' -Di(tert-butyl-peroxy)-diisopropyl benzene

3. Finished products

In addition to the requirements stipulated in the particular sections, the commodities must also comply with the following conditions:

No peroxide residues must be detectable in commodities made from polyurethanes⁵.

³ These emulsifiers are incorporated into the macromolecules, so that in the finished products only minute, technically unavoidable, harmless amounts remain, which have no effect on smell or taste.

⁵ See 58th Communication on the Testing of Plastics, Bundesgesundheitsblatt 40 (1997) 412