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## V. Polystyrene Produced Exclusively from the Polymerisation of Styrene

As of 01.09.2017

There are no objections to the use of polystyrene produced solely from the polymerisation of styrene 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 the following conditions are met:

1. The use of styrene as starting material is subject to the stipulations laid down in the Commission Regulation (EU) No 10/2011.
2. Additives permitted by the Commission Regulation (EU) No 10/2011 may be used in accordance with the restrictions stipulated therein. Besides these substances, the raw polymer or finished products must contain no more of the following production aids, used during manufacture and processing, than the maximum amounts given<sup>1</sup>:

a) Residues of conversion products from the following catalysts:

For the catalysts mentioned below isododecane may be added as phlegmatizing agent. The transfer from the final product may not exceed 5 mg isododecane/kg foodstuff.

- Azobisisobutyronitrile
- Benzoyl peroxide
- Aliphatic diacyl(C<sub>8</sub>-C<sub>12</sub>) peroxide
- Di-tert-butyl peroxide
- tert-Butyl-hydroperoxide
- tert-Butylperoxy-(2-ethylhexanoate)
- tert-Butyl peroxybenzoate
- Pinane hydroperoxide
- Cumyl hydroperoxide
- Dicumyl peroxide
- tert-Butyl peroxyacetate
- Potassium peroxydisulfate
- Sodium pyrosulfite
- tert-Butyl-perisononanoate
- 1,1-Bis-tert-butylperoxy-cyclohexane, max. 0.05 %
- tert-Butyl-peroxy-(2-ethyl-hexyl)carbonate
- 2,2-Bis-[4,4-di(tert-butylperoxy)cyclohexyl]propane, max. 0.05 %
- 2,5-Dimethyl-2,5-di(tert-butylperoxy)hexane
- O,O-tert-Butyl-O-isopropyl-monoperoxy carbonate, max. 0.05 %
- O,O-(1,1-Dimethylpropyl)-O-(2-ethylhexyl)-monoperoxy carbonate  
(only in the manufacture of foamed polystyrene)
- Di-tert-butylperoxyazolate, max. 0.1 %

in total  
max 0.2 %

<sup>1</sup> Such production aids include polymerisation regulators that are occasionally used (e.g. dodecyl mercaptane, poly-p-diisopropylbenzene), as well as cross-linking agents. These substances are completely incorporated in the polymer during polymerisation.

Poly-p-diisopropylbenzene (mol. wt. c. 1000)

tert-Amylperoxy-3,5,5-trimethylhexanoate, max. 0.2 %.

The named peroxide catalysts may be mixed with up to an equal amount of dimethyl- phthalate as pasting agent.

Poly(oxy(methyl-1,2-ethandiyl)), alpha-hydro-omega-(((1,1-dimethylethyl)dioxy)carbonyl)-oxy), ether with 2,2-bis(hydroxymethyl)-1,3-propanediol (50 %) and ethylbenzene (50 %), in total max. 0.14 %.

b) Residues of the following emulsifiers and suspending agents:

$\alpha$ -Hydroxyoctadecane sulfonic acid, sodium salt

Alkyl sulfonates C<sub>10</sub>-C<sub>20</sub>

Alkylaryl sulfonates

Alkyl sulfates<sup>2</sup>

Polyvinyl alcohol (viscosity of 4 % aqueous solution at 20 °C min. 5 cP)

Polyvinyl pyrrolidone<sup>3</sup> and/or copolymers of vinyl pyrrolidone with acrylic acid - or methacrylic acid esters of monohydric, saturated aliphatic alcohols C<sub>1</sub>-C<sub>8</sub>

Polyvinyl propionate

Copolymers of maleic anhydride with ethylene and/or propylene and/or butylene (viscosity of 0.5 % aqueous solution at 25 °C min. 400 cP)

Copolymer of N-vinyl-N-methylacetamide and acrylic acid, 2-ethylhexylester, max. 0.4 %. The proportion of acrylic acid ester in the copolymer is no more than 10 %.

Poly-N-vinyl-N-methylacetamide, max. 0.4 %

Polyethylene oxide adducts of saturated, monohydric aliphatic alcohols C<sub>12</sub>-C<sub>20</sub><sup>2</sup>

Barium sulfate<sup>3</sup>, free of soluble barium salts in accordance with the European Pharmacopoeia, max. 0.2 %

in total  
max.  
2.5 %

3. In the manufacture of foamed polystyrene, besides the expanding agents permitted in accordance with the Commission Regulation (EU) No 10/2011, the following may also be used:  
Aliphatic hydrocarbons with chain lengths up to C<sub>8</sub>

1000 ml of expanded polystyrene must contain no more than 2.0 g of this expanding agent as residue.

4. When heated to 90 °C for 24 hours, commodities made from non-expanded polystyrene must give off no more than 15 mg/dm<sup>2</sup> of volatile organic components<sup>4</sup>. Commodities made from foamed polystyrene may, in addition to this, contain the amount of volatile expanding agent stipulated under No. 3.

5. Finished products must not test positively for peroxides<sup>5</sup>.

<sup>2</sup> In part permitted in accordance with the Commission Regulation (EU) No 10/2011. Migration of this substance into food-stuffs is regulated by the Commission Regulation (EU) No 10/2011.

<sup>3</sup> Permitted in accordance with the Commission Regulation (EU) No 10/2011. Migration of this substance into foodstuffs is regulated by the Commission Regulation (EU) No 10/2011.

<sup>4</sup> Determination method, see 19th Communication on testing of plastics, Bundesgesundheitsblatt 14 (1971) 265.

<sup>5</sup> See 58th Communication on testing of plastics, Bundesgesundheitsblatt 40 (1997) 412