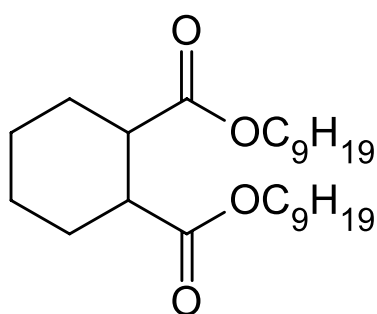




**Actualité substitution**

**DINCH, an alternative to DEHP adopted by the market**

DINCH (1,2-cyclohexanedicarboxylic acid, diisononyl ester, CAS No. 166412-78-8) is an aliphatic diester developed by BASF in 2002.



DINCH is used as a plasticizer for PVC and is employed by various sectors such as medical devices (blood bags, catheters, syringes, ...) and building materials (wall coverings, floor coverings, ...).

According to its producer BASF, DINCH presents many technical advantages (despite its lower plasticizing power compared to DEHP): low levels of viscosity, volatility and density; excellent low temperature flexibility of PVC and good chemical resistance.

Flexible PVC containing DINCH can undergo various treatments including extrusion, calendaring, injection molding and rotational molding.

According to BASF, the use of DINCH to replace phthalates requires minimal modifications in formulation and process parameters and does not require significant investment in existing production lines.

From a regulatory point of view, DINCH:

- meets the requirements of the European Directives 93/42/EC and 2007/47/EC on medical devices
- may be used as an additive or an auxiliary product for the production of polymers intended to come into contact with foodstuffs<sup>[1]</sup>
- is not listed in the EU regulations on dangerous substances<sup>[2]</sup> or EU regulations on toys<sup>[3]</sup>

Indeed, in a 2016 *expert assessment*, ANSES<sup>[4]</sup> identified this substance as one of alternatives to phthalates in toys that can be put in their mouth by children under 3. Nev-



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ertheless, in a *2015 opinion*, ANSES considers that uncertainty remains on the safety of the exposure to DINCH via medical devices used for premature babies.

DINCH is nowadays the favorite alternative to DEHP for the PVC manufacturers. Several companies produce and market it, among them BASF and EVONIK (respectively with the trade names HEXAMOLL and ELATUR CH).

**Sources**

<https://www.anses.fr/fr/system/files/REACH2015re0003.pdf>

<http://www.plasticizers.basf.com/portal/load/fid255203/Hexamoll%C2%AE%20DINCH%C2%AE.pdf>

[http://www13.evonik.com/bk2/product\\_finder/evonik\\_product\\_Detail.asp?aktProdID=3166&showTitle=true&padding=on](http://www13.evonik.com/bk2/product_finder/evonik_product_Detail.asp?aktProdID=3166&showTitle=true&padding=on)

**VALPURE® V70 : Another bisphenol as an alternative to BPA, under evaluation for food contact**

The Valspar company has developed the epoxy resins VALPURE® V70 based on tetramethyl bisphenol F (TMBPF, CAS No. 5384-21-4), likely to replace bisphenol A-based resins for inner coatings of metal food packaging.

According to Valspar, epoxy resins VALPURE® V70 show the same performance as epoxy resins based on BPA and do not require any significant process or reformulation adjustments. Because of its structural similarity to bisphenol A, the ANSES *is currently evaluating the health safety* of TMBPF, of TMBPF-DGE<sup>[5]</sup>, and if necessary their impurities, degradation products and oligomers.

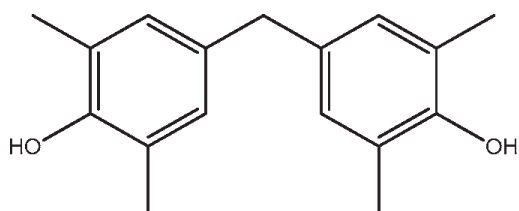
[1] according to Regulation (EU) No 10/2011 of the European Commission concerning plastic materials and articles intended to come into contact with food

[2] annex XVII of the Regulation (EC) No 1907/2006 listing restrictions on the manufacture, placing on the market and use of some dangerous substances and some dangerous mixtures and articles

[3] 2009/48/CE directive on the safety of toys

[4] french Agency for Food, Environmental and Occupational Health & Safety

[5] comonomer produced by the chemical reaction between TMBPF and epichlorohydrin, n°CAS = 113693-69-9.



Tetramethyl bisphenol F, n° CAS=5384-21-4

ANSES considered that at this stage there is no argument that TMBPF and TMBPF-DGE are endocrine disruptors, while noting that an endocrine disruptor can act by activation / inhibition involving other kinds of enzymes and receptors than those evaluated in this expertise. Furthermore, ANSES has not been able to conclude definitively on the mutagenic and genotoxic potential of these substances, and Valspar is currently working on additional tests (the *full report* is available on the ANSES website).

Migration tests for TMBPF, TMBPF-DGE on food simulants (aqueous, acidic, alcoholic foods and some foods containing emulsified fat in aqueous phases) make it possible to envisage heat treatments without condition of time for any temperature below 130 °C (similar to those used for BPA-based epoxy varnishes).

TMBPF does not generate degradation products neither at its melting point (186 °C) nor at its boiling point (245 °C). TMBPF and TMBPF-DGE are authorized by the FDA in the United States to produce coatings for use in contact with food. The Canadian authorities have authorized the use of TMBPF and TMBPF-DGE for applications in contact with aqueous, acidic, alcoholic foods (up to 15%) with thermal treatments up to 130° C. The Dutch authorities have set specific migration limits for TMBPF, TMBPF-DGE and their derivatives, which should be published in the next update of the Dutch legislation on food contact.

### Sources

<https://www.anses.fr/fr/system/files/ESPA2015SA0117.pdf>

<http://www.valsparpackaging.com/valpure/item/our-materials/#omNBPAE>

## Alternatives to BPA in dental materials : orthodontic bonding systems

Adhesives used to bond the orthodontic brackets and splints<sup>[6]</sup> to the teeth of patients can be formulated from Bis-GMA (a derived product from bisphenol A). As outlined in Newsletter 10, Bis-GMA can imply the presence of bisphenol A in the mouth cavity.

ELSODENT has developed an orthodontic bonding system for metallic and ceramic brackets without BPA and Bis-GMA: the Nisicem Ortho. Based on baryum boro alumi-

[6] system intended to avoid tooth movements after orthodontic treatment

[7] diisocyanates may be used in the composition of this monomer, the potential risk of these substances is discussed in the context of the European REACH regulation



nosilicate (CAS No: 65997-17-3), methacrylate phosphate (CAS No: 85590-00-7) and a mixture of methacrylates (CAS No: 6606-59-3).

The Nisicem Ortho bonding system should not, according to ELSODENT, give rise to the fracture of enamel during the removal of the bracket. Moreover, since this product is slightly phosphorous, the detection of residues of glue to be eliminated during the removal of the brackets is easier.

A substitution solution for splints bonded by BPA-based adhesives is the direct splint technique via the use of the Brush Dip of the Sun Medical company. This adhesive fixes only the interdental contacts and prevents the dental movements related to an orthodontic recurrence.

The nature of the dip brush resin, free of composite materials (thus without BPA and its derivatives), is the "4 META" type. It is composed of a polymer, the PMMA (polymethyl methacrylate), a mixture of monomers (methyl methacrylate, 4-META: 4-methacryloyloxyethyl trimellitate anhydride and Glycerol dimethacrylate), and an activator (TBB: Tri-n-Butyl Borate).

Since the Brush-dip system is not filled, it can be deformed during mechanical stresses without the risk of breakage, but this lack of filling raises the question of its resistance to wear over time.

### Sources

<http://www.elsodent.com/wp-content/uploads/ELSODENT-PRO-DUITS-DENTAIRE-CATALOGUE-FEVRIER-2017-ONLINE.pdf>

<http://www.elsodent.com/wp-content/uploads/ELSODENT-FICHE-DE-SECURITE-NISICEM-FDS-F.pdf>

[http://www.generiqueinternational.com/docs/65\\_CLIN-IC\\_2014\\_35\\_541-545\\_Lucile\\_DAHAN.pdf](http://www.generiqueinternational.com/docs/65_CLIN-IC_2014_35_541-545_Lucile_DAHAN.pdf)

## New cables for automatism without PVC and therefore phthalates-free

NEXANS has put on the market the MOTIONLINE® HALEX flexible PVC-free cable product family for automation in industrial applications (cables for chains, sensors, servomotors, bus, industrial Ethernet, etc.).

According to its manufacturer, sheaths of cables of the MOTIONLINE® HALEX product line provide low bending radii and are resistant to abrasion, oils and refrigerant lubricants.

According to NEXANS, in the event of a fire, the combustion of these cables produce no highly toxic or irritating gases, and moreover the material constituting these cables delays fire propagation.

Finally, the manufacturer declares that the MOTIONLINE® HALEX series cables have a low extra cost compared to PVC cables and that this additional cost is well below that of the polyurethane cables, which currently represent the most widespread alternative to cables in PVC.

### Sources

[https://www.nexans.com/eservice/Corporate-en/navigate-pub\\_142506\\_-35442/Nexans\\_launches\\_PVC\\_free\\_MOTIONLINE\\_HALEX\\_automati.html](https://www.nexans.com/eservice/Corporate-en/navigate-pub_142506_-35442/Nexans_launches_PVC_free_MOTIONLINE_HALEX_automati.html)



## Agenda

### **POLYMERS IN CABLES 2017 – Pittsburgh (United-States) from 20/06 to 21/06/2017**

The program of the conference includes a presentation of PERSTORP about an ester plasticizer in PVC cable.

<http://www.amiplastics-na.com/events/Event.aspx?code=C814&sec=7906>

### **Salon FIP Solution Plastique in Lyon (France) from 13/06 to 16/06/2017**

FIP Solution Plastique will gather suppliers of the plastic industry. The rubber sector will be privileged with a “FIP SOLUTION CAOUTCHOUC” visitor trail to guide visitors to stands corresponding to their projects, cutting-edge solutions presented on the wall of innovations and a technical day organized by AFICEP<sup>(\*)</sup>.

(\*) French Association of Engineers and Executives of Rubber and Polymers sector

<http://www.f-i-p.com/en/>

### **PACKINNOVE 2017 in Troyes (France) from 14/06 to 15/06/2017**

This Packaging event combines PackInnove Europe and PackInnove Machine, two complementary conventions that bring together decision-makers from the packaging industry via an innovation forum, expert workshops and conferences.

<http://www.packinnove.com/en/>