

## Selected substances for the development of HBM methods 2010-2019

Year of selection	Name (CAS-No.)	Use	Method development
2010	DINCH 1,2-Cyclohexane dicarboxylic acid diisononyl ester (166412-78-8 Isomere mixture)	Plasticizer: phthalate substitute in toys, food packaging material, medical devices	Completed, published. Validation by the German Research Foundation (DFG) is completed.
	DPHP Di(2-propylheptyl)phthalate (53306-54-0)	Plasticizer: technologically replaces the phthalate DIDP in PVC-products for technical applications	Completed, published. Validation by DFG is completed.
	HBCDD Hexabromocyclododecane (25637-99-4)	Flame retardant	Completed. Validation by DFG is completed.
	4-Nonylphenol, branched (84852-15-3)	Starting material for the synthesis of nonylphenol ethoxylates, monomer for phenolic resins. Antioxidant/Stabilizer in technical oils	Completed. Validation by DFG is completed.
	4-tert-Octylphenol (140-66-9)	Intermediate for the preparation of synthetic resins (used for rubber production for tyres) and non-ionic surfactants	Completed. Validation by DFG is completed.
2011	4-MBC 3-(4-Methylbenzyliden)-camphor (36861-47-9)	UV-filter for cosmetics	Completed. Validation by DFG is in process.
	MDI Methylenediphenyl-diisocyanate (101-68-8 and 26447-40-5)	Insulating foam	Completed, published. Validation by DFG is in process.
	2-MBT 2-Mercaptobenzothiazole (149-30-4)	Vulcanization accelerator	Completed, published. Validation by DFG is completed.
	NMP N-Methyl-2-pyrrolidone (872-50-4)	Solvent in many technical applications, ingredient in paint, graffiti remover and carpeting	Completed. Validation by DFG is completed.
	NEP N-Ethyl-2-pyrrolidone (2687-91-4)	Polar aprotic solvent, substitute for NMP, e. g. for surface coatings, in cleaning agents and paint strippers	Completed. Validation by DFG is completed.

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2012	CMI/MI (3:1) 5-Chloro-2-methyl-3-isothiazolinone / 2-Methylisothiazol-3(2H)-one (55965-84-9)	Preserving additive in cosmetics and industrial products, biocides	Completed, published. Additionally, a method for another biomarker, mercapturic acid metabolite, is being developed.
	Geraniol (106-24-1)	Fragrance	Completed. Validation by DFG is completed.
	D4 Octamethylcyclotetrasiloxane (556-67-2)	Ingredient in cosmetics	Method development for urine not possible; finished without success.
	D5 Decamethylcyclopentasiloxane (541-02-6)		
D6 Dodecamethylcyclohexasiloxane (540-97-6)			
2013	ASE/ASEP, Mesamoll® C10-C21 Alkylsulfonic acid phenylester (91082-17-6)	Plasticizer	In process.
	TOTM Tri(2-ethylhexyl)trimellitate (3319-31-1)	Plasticizer; replaces phthalates mainly in medical devices	Completed, published.
	DEHTP Di(2-ethylhexyl)terephthalate (DEHT, DOTP) (6422-86-2)	Plasticizer	Completed, published.
	OMC Octylmethoxycinnamate (5466-77-3)	UV-filter for cosmetics	In process.
	BHT Butylated Hydroxy Toluene 2,6-Di-tert-butyl-p-cresol (128-37-0)	Antioxidant, food additive	Completed. Validation by DFG is completed.

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2014	DINA Diisononyladipate (33703-08-1)	Plasticizer	In process.
	DEHA Di-(2-ethylhexyl)adipate 103-23-1	Plasticizer	Completed, published.
	OC Octocrylene (2-Ethylhexyl 2-cyano-3,3-diphenyl-2-propenoate) (6197-30-4)	UV-filter for cosmetics; stabilizer for plastics e.g. for food packaging material	Completed, published.
	TDI Tolylene-diisocyanate 2,4-TDI (584-84-9) and 2,6-TDI (91-08-7)	Foam and adhesives	In process.
	Lysmeral 2-(4-tert-Butylbenzyl) propionaldehyde (80-54-6)	Fragrance	Completed, published. Validation by DFG is completed.
2015	EHS 2-Ethylhexylsalicylate (Octisalate) (118-60-5)	UV-filter for cosmetics	Completed, published.
	Climbazole 1-(4-Chlorophenoxy)-1- (imidazol-1-yl)3,3- dimethylbutan-2-one) (38083-17-9)	Cosmetics preservative	In process.
	UV 328 2-(2H-Benzotriazol-2-yl)-4,6-di- tert.pentylphenol (25973-55-1)	UV-absorber for plastics and paints	In process.
	7-Hydroxycitronellal (107-75-5)	Fragrance	Completed, published. Validation by DFG is completed.

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2016	TDCPP Tris(1,3-dichloroisopropyl) phosphate (13674-87-8)	Flame retardant	Completed, published.
	Avobenzone (BMDBM) Butylmethoxydibenzoyl methane (70356-09-1)	UV-filter in cosmetics	In process.
	Keromet MD $\alpha,\alpha'$ -(1-methylethylene diimino)di-o-cresole (94-91-7)	Fuel additive	Method development for urine not possible as under physiological conditions Keromet degrades immediately to unspecific substances.
	DnBA, Dibutyl adipate (105-99-7)	Plasticizer, Cosmetic ingredient	In process.
	DHHB Uvinul A Plus Diethylamino-hydroxybenzoyl-hexyl-benzoat (302776-68-7)	UV-filter in cosmetics	Completed, published soon.
2017	Ethoxyquin 6-ethoxy-2,2,4-trimethyl-1,2-dihydroquinoline (91-53-2)	Feed additive	Method development needs at least two years.
	BADGE Bisphenol A diglycidyl ether mono-constituent substance: (1675-54-3) and multi-constituent substance (25068-38-6)	Epoxy resin coating for food packaging material	
	UV-P 2-(2H-benzotriazol-2-yl)-p-cresol (2440-22-4)	UV-filter in varnish, polyurethane, plastics and rubber, adhesives and sealants, coating products and fillers	
	UV 327 2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)phenol, Tinuvin 327 (3864-99-1)	UV-filter for plastics/ food packaging materials	
	1-H-Benzotriazole (95-14-7)	lubricants and greases, washing & cleaning products, anti-freeze products, coating products and heat transfer fluids	

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Year of selection	Name (CAS-No.)	Use	Method development
2018	<b>Bronopol</b> 2-bromo-2-nitropropane-1,3-diol (52-51-7)	Preserving additive in cosmetic products, biocide for preserving e.g. wall colour	Method development needs at least two years.
	<b>2-Phenoxyethanol</b> (122-99-6)	Preserving additive in cosmetic products. Biocide for disinfection of surfaces and hands, solvent e.g. in adhesives for carpeting	
	<b>Rose oxide</b> Tetrahydro-4-methyl-2-(2-methylprop-1-enyl)pyran (16409-43-1)	Fragrance used in cosmetic, hygiene, wash, cleaning and household products	
	<b>Homosalate</b> 3,3,5-Trimethylcyclohexyl 2-hydroxybenzoate (118-56-9)	UV-filter in cosmetics	
2019	<b>PBO</b> Piperonyl butoxide (51-03-6)	Biocide frequently used as a synergist with pyrethroids	
	<b>DCPP</b> 5-chloro-2-(4-chlorophenoxy)phenol (3380-30-1)	Biocide for cleaning agents and disinfectants, used e.g. in restaurants or ice cream shops	
	<b>Fipronil</b> (120068-37-3)	Broad-spectrum insecticide used e.g. in products for animal treatment (fleas/ticks), as ant repellent, as pesticide). Authorised for seed treatment until 31.07.2018.	
	<b>2,4-DTBP</b> 2,4-Di-tert-butylphenol (96-76-4)	Intermediate product, breakdown product of a plastic additive; plastic packaging for food; drinking water pipes	