Hazardous Chemicals in Products

- the need for enhanced EU regulations -

Brussels, 29th October 2013

Indoor emissions

Christine Däumling
German Federal Environment Agency II 1.3

Committee for Health Evaluation of Building Products

Umwelt Bundes Amt
Für Mensch und Umwelt

Importance of emission testing - our own experience

When building our new headquarter in Dessau, 2004 ….

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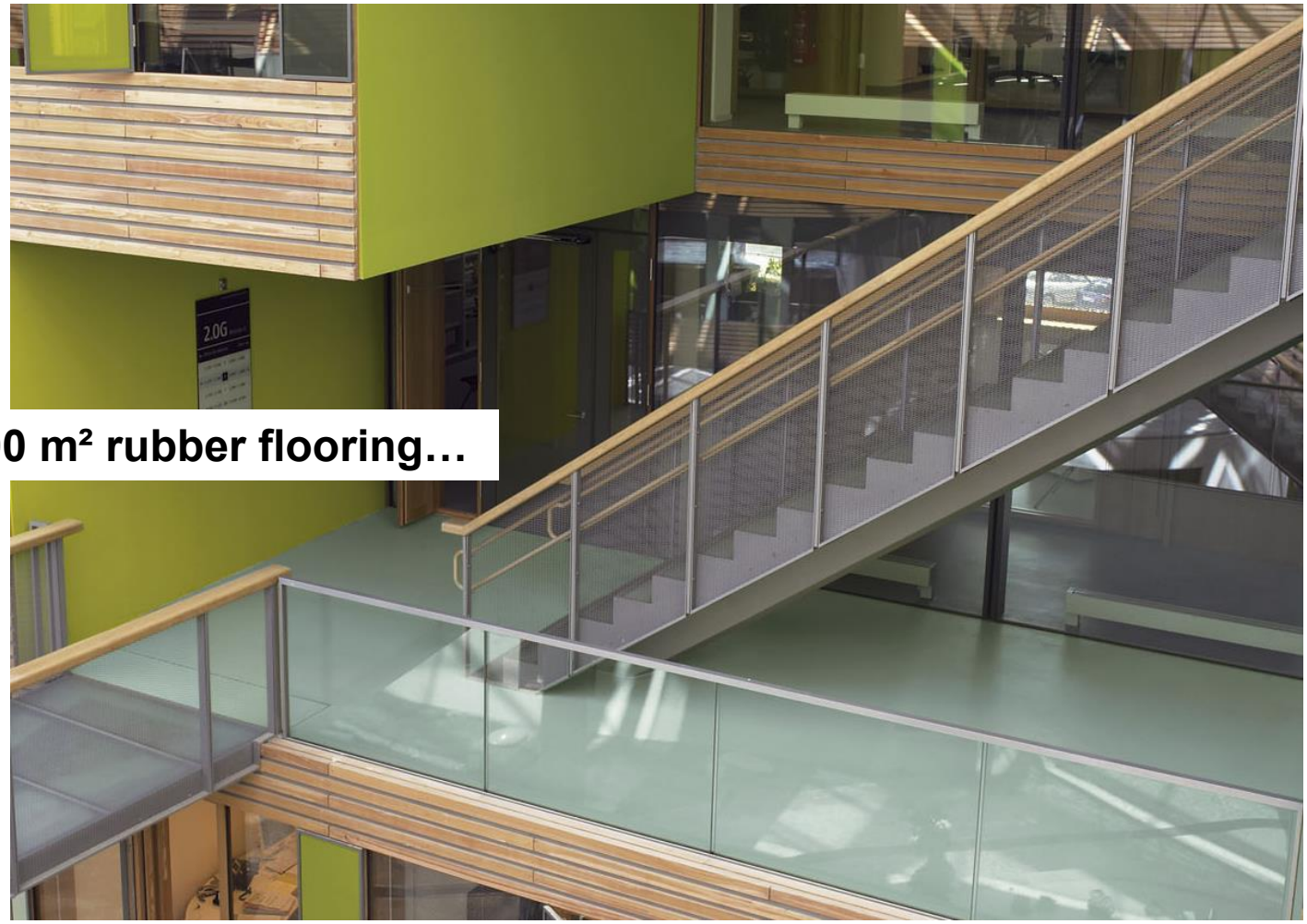
" Only materials which respond to high health- and environment compatibility standards with regard to source, transport, manufacture, use and disposal shall be used“



e.g. 18,600 m² rubber flooring…

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Sample preparation
(accord. EN ISO 16000-11)

Emission test
in **chamber**
after
3 and 28 days
(EN ISO 16000-6, -9, -10)

Evaluation
According to
AgBB-scheme

Results were beyond the limits of **AgBB-criteria**
for carcinogens
of EU-Cat 2 :
LCI value 50 µg/m³
Naphthalene: <u>3 fold</u>

for carcinogens
of EU-Cat 1 A and B:
1,3 Dichlorpropanol
<u>22-fold</u>

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Indoor air measurements in final construction phase, 6 to 8 weeks after installation of rubber flooring, in µg/m³

room	Rubber flooring	Naphthalin			TVOC		
		closed	after ventil.	open	closed	after ventil.	open
006	**installed**	56	47		730	550	
007	**Installed**	61	50		790	560	
008	**Installed**	62	50		780	500	
009	**installed, without door**			45			530
031	**No flooring (nearby)**			16			550
180	**No flooring (nearby)**			14			570
313	**No flooring (far away)**			3			680

UBA Dessau, July 2004, active sampling, 21°C

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Indoor air measurements in final construction phase, 6 to 8 weeks after installation of rubber flooring, in µg/m³

room	Rubber flooring	1,3-Dichloro-2-propanol			Naphthalene		
		closed	after ventilation	open	closed	after ventilation	open
006	**installed**	2,5	2,4		56	47	
007	**Installed**	3,0	2,5		61	50	
008	**Installed**	2,7	2,3		62	50	
009	**installed, without door**			3,9			45
031	**no flooring (nearby)**			1,7			16
180	**no flooring (nearby)**			0,6			14
313	**no flooring (far away)**			0,4			3

UBA Dessau, July 2004, active sampling, 21°C

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Indoor Guide Values

German Indoor Air Hygiene Commission, 2013 for 39 relevant substances

	Richtwert II (mg/m^3)	**Richtwert I** (mg/m^3)	Festgelegt in
Toluol	**3**	**0,3**	1996
Dichloromethan	**2** (24 h)	**0,2**	1997
CO	**60** (30 min); **15** (8 h)	**6** (30 min); **1,5** (8 h)	1997
PCP	**0,001**	**0,0001**	1997
NO_2	**0,35** (30 min); 0,06 (Woche)	--	1998
Styrol	**0,3**	**0,03**	1998
Hg	**0,00035**	**0,000035**	1999
TCEP	**0,05**	**0,005**	2002
Alpha-Pinen	**2**	**0,2**	2003
Naphthalin	**0,02**	**0,002**	2004
Aliphatische Kohlenwasserstoffe (C9 bis C14)	**2**	**0,2**	2005
PCB gesamt	**0,01 (PCB-118)**		2007
TVOC	**1000/3000/10000/25000** [1]	**300**	2007
CO_2 (ppm)	**2000**	**1000**	2008
Aldehyde, C4 bis C11; gesättigte azyklische aliphatische	**2**	**0,1**	2009

[1] verschiedene Stufen, für Details siehe Umweltbundesamt 2007: "Beurteilung von Innenraum..", Bundesgesundheitsblatt, Gesundheitsforschung, Gesundheitsschutz 50: 990-1005

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Real life, continued…

After removing the rubber flooring and replacing it by a low emitting material troubles persisted – **who pays the bill?**

Questions at court:

- Was it necessary to remove the material or could a simple enforced ventilation have resolved the problem?
- Can you expect all European manufacturers to know about German requirements for flooring materials?
- A reference product was named – but who defines the quality criteria for equivalence, how can they be proved?
- Is off-gassing of carcinogens a deficit if there are no legal limit values?
-….

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German Approach in AgBB-Scheme: Fundamentals in Assessment of Chemical Emissions from (~~Building~~?) Products

1. to **assess the toxicological relevance** of **all** detected **single substances**

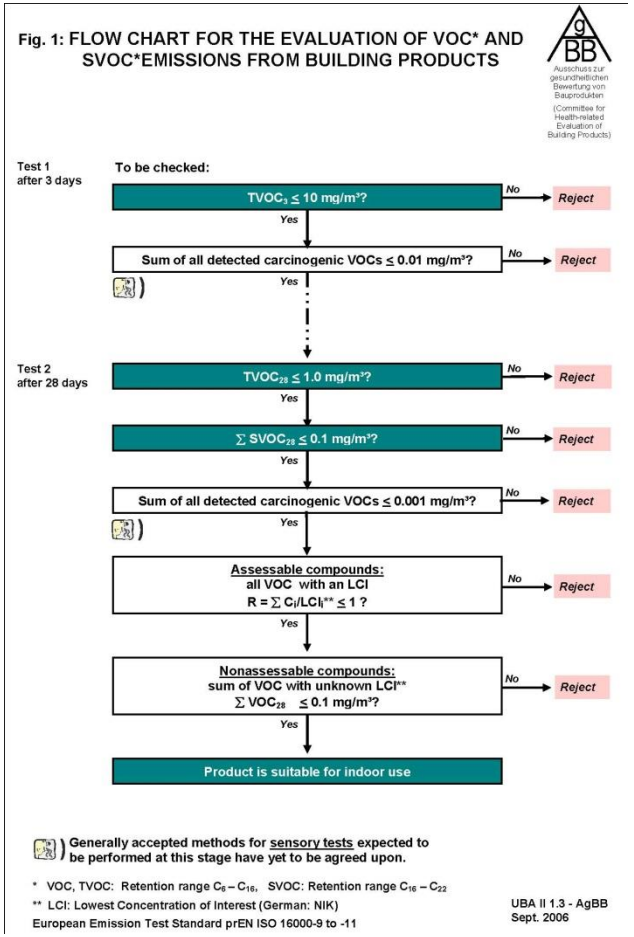
- **Harmless and relevant substances with LCI values**
- **Carcinogens**

2. to **limit the unassessable substances** (precautionary principle)

- **$VOC_{without\ LCI}$**

3. to **limit the total amount** of emissions of volatile organic compounds

- **TVOC, TSVOC**



Mandatory testing and approval in Germany since 2006

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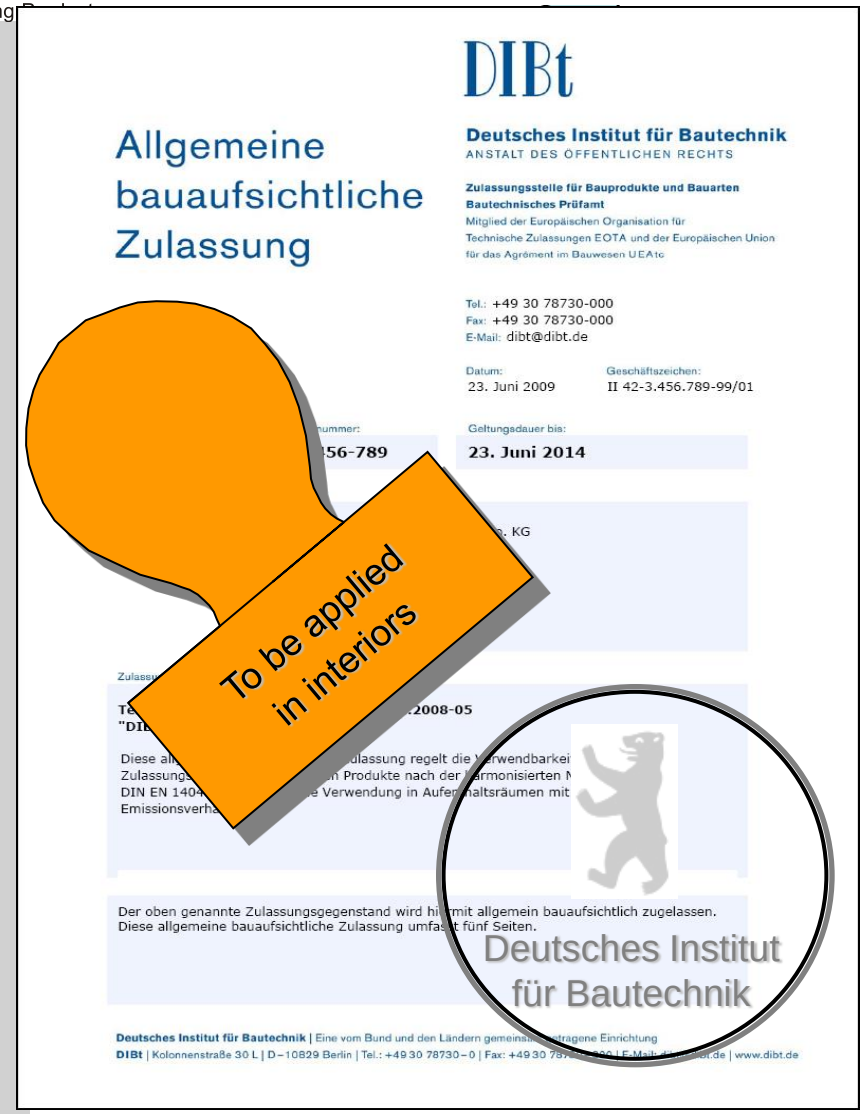
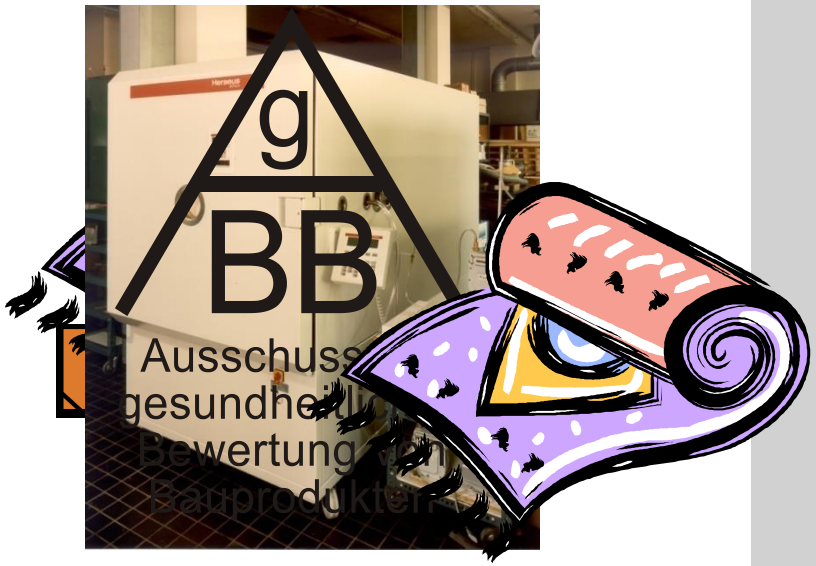
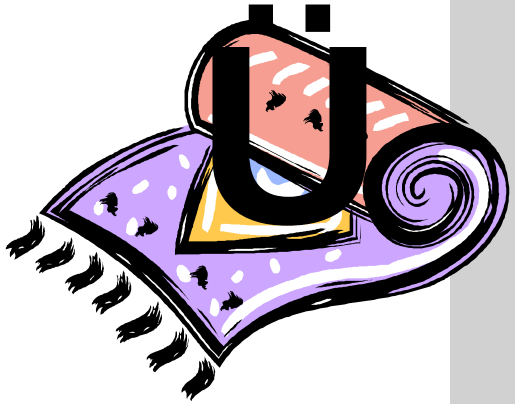


1. Application
2. Product
3. Chemical composition
4. Emission test
5. Evaluation
6. Approval



Compliance check and surveillance in Germany

1. Application
2. Product
3. Chemical composition
4. Emission test
5. Evaluation
6. Approval
7. Compliance
8. Surveillance



© By courtesy of Doris Kirchner, DIBt

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From testing to labelling – in the common European market?

CEN TC 351 WG 2
harmonisation of testing standards

Test	Report	Evaluation	Label
what how	Resulting Values Conc./**LCI**	Who defines **LCI** national or EU?	**CE** **Ü** Performance classes?
when how long	How to condense? R? (Risk value)	How to simplify? Pass/fail?	Voluntary or mandatory labelling?

ISO 16000 series…

Architects, Consumers..

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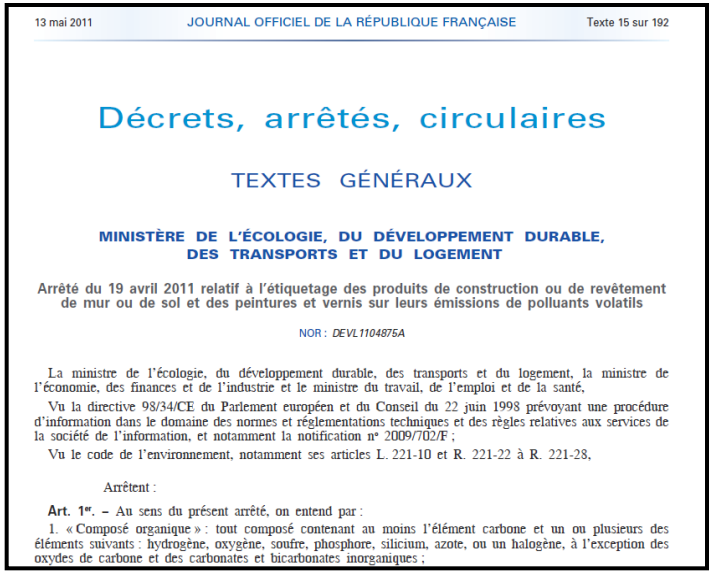
Three European countries are determined to limit the emissions from building products into indoor air..



13 mai 2011 JOURNAL OFFICIEL DE LA RÉPUBLIQUE FRANÇAISE Texte 15 sur 192

Décrets, arrêtés, circulaires

TEXTES GÉNÉRAUX

MINISTÈRE DE L'ÉCOLOGIE, DU DÉVELOPPEMENT DURABLE, DES TRANSPORTS ET DU LOGEMENT

Arrêté du 19 avril 2011 relatif à l'étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils

NOR : *DEVL1104875A*

La ministre de l'écologie, du développement durable, des transports et du logement, la ministre de l'économie, des finances et de l'industrie et le ministre du travail, de l'emploi et de la santé,

Vu la directive 98/34/CE du Parlement européen et du Conseil du 22 juin 1998 prévoyant une procédure d'information dans le domaine des normes et réglementations techniques et des règles relatives aux services de la société de l'information, et notamment la notification n° 2009/702/F ;

Vu le code de l'environnement, notamment ses articles L. 221-10 et R. 221-22 à R. 221-28,

Arrêtent :

Art. 1er. – Au sens du présent arrêté, on entend par :

1. « Composé organique » : tout composé contenant au moins l'élément carbone et un ou plusieurs des éléments suivants : hydrogène, oxygène, soufre, phosphore, silicium, azote, ou un halogène, à l'exception des oxydes de carbone et des carbonates et bicarbonates inorganiques ;

DRAFT

KINGDOM OF BELGIUM

FEDERAL PUBLIC SERVICE OF HEALTH, FOOD CHAIN SAFETY AND ENVIRONMENT

Royal Decree establishing threshold levels for the emissions to the indoor environment from construction products for certain intended uses

ALBERT II, King of the Belgians,

Greetings to all present and future citizens.

Having regard to Regulation (EU) No. 305/2011 of the European Parliament and the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC;

Having regard to the Act of 21 December 1998 on product standards to promote sustainable production and consumption patterns and to protect the environment, public health and employees, Articles 5, § 1, 1 and 3, and 15, § 3;

in principle they all rely on LCI values for evaluation of measured emissions but in a different way

http://www.klosterkirche.de/zeiten/pfingsten/img/turm-babel.jpg

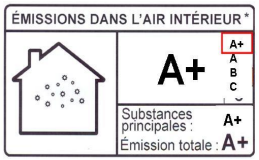
TÜV Rheinland Gruppe ECO PROOF

Focus here on two different mandatory systems in Europe with core LCI evaluation:

Since 2005 Germany:

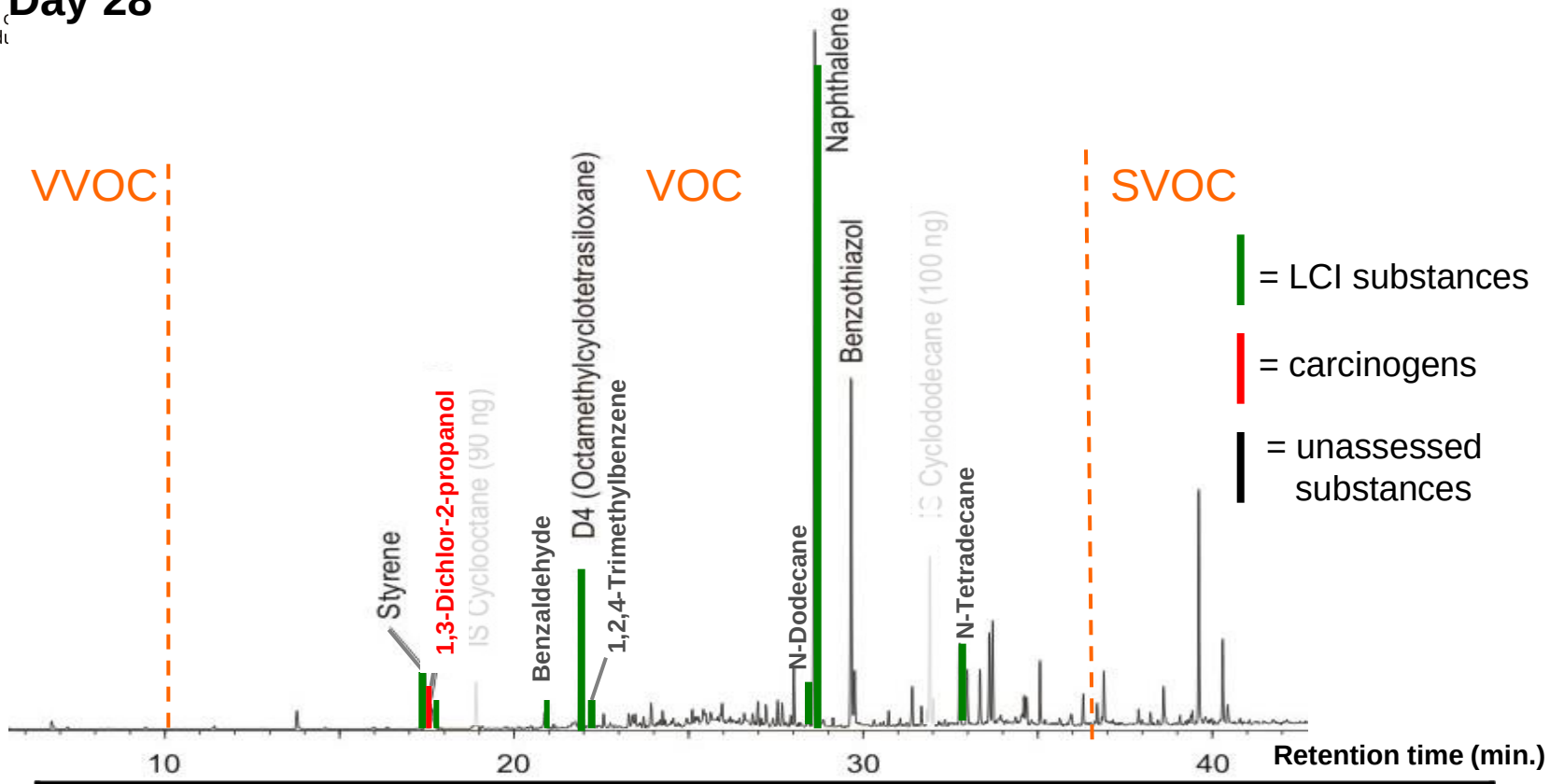
gBB Ausschuss zur gesundheitlichen Bewertung von Bauprodukten

Since 2011 France:



Rubber flooring – evaluation via LCI

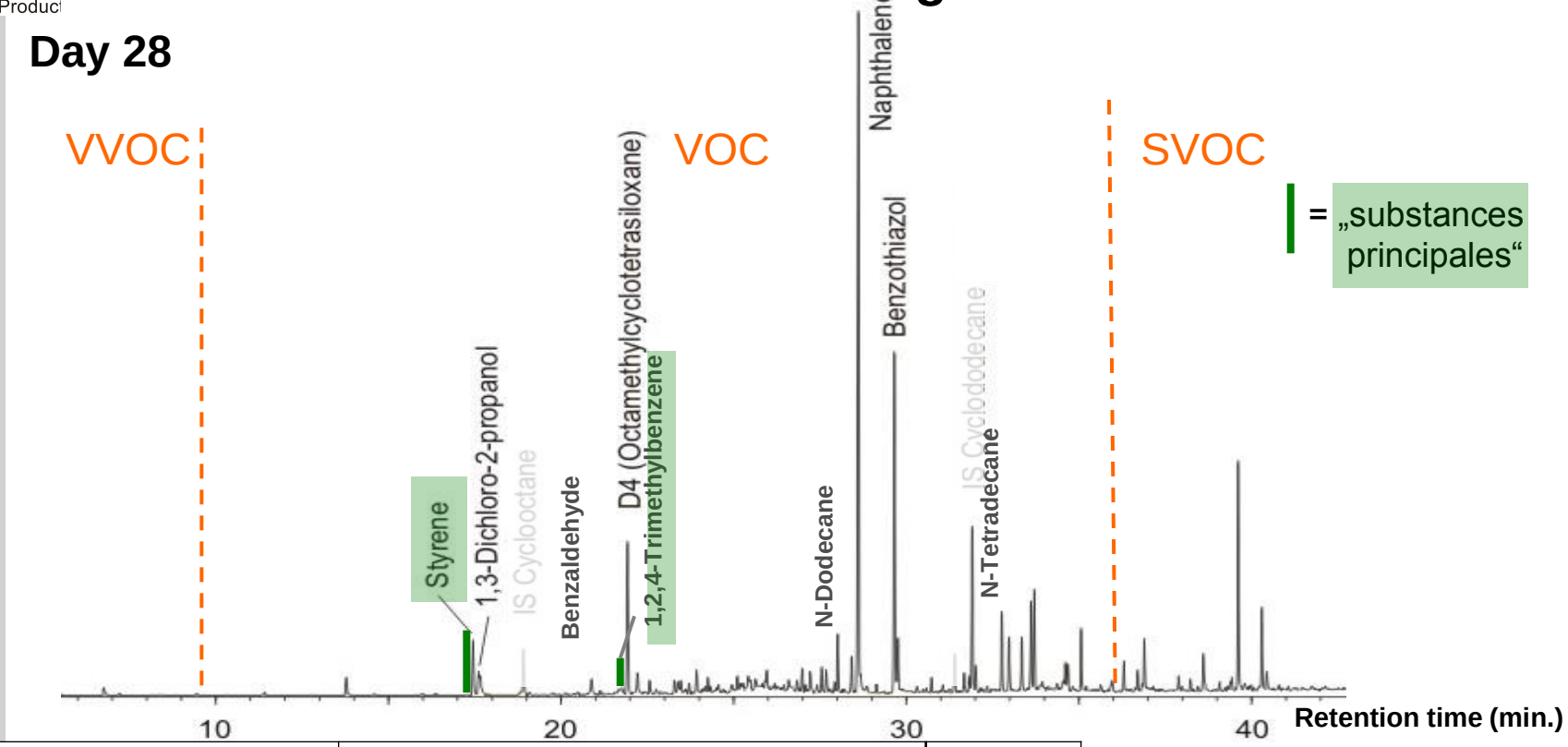
Day 28



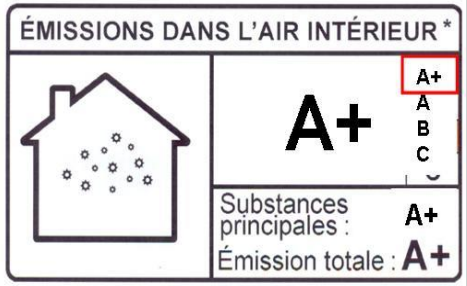
	(NIK-) limit (µg/m³)	Result (µg/m³)	Classification
1,3-Dichlor-2-propanol	≤ 1	**22**	**EU Carc. Cat. 2**
Naphthalene	≤ 50 (2004)	**136**	EU Carc. Cat. 3
Non-assessables	≤ 100	**172**	

REJECTED

Rubber flooring – evaluation with 10 labelling substances

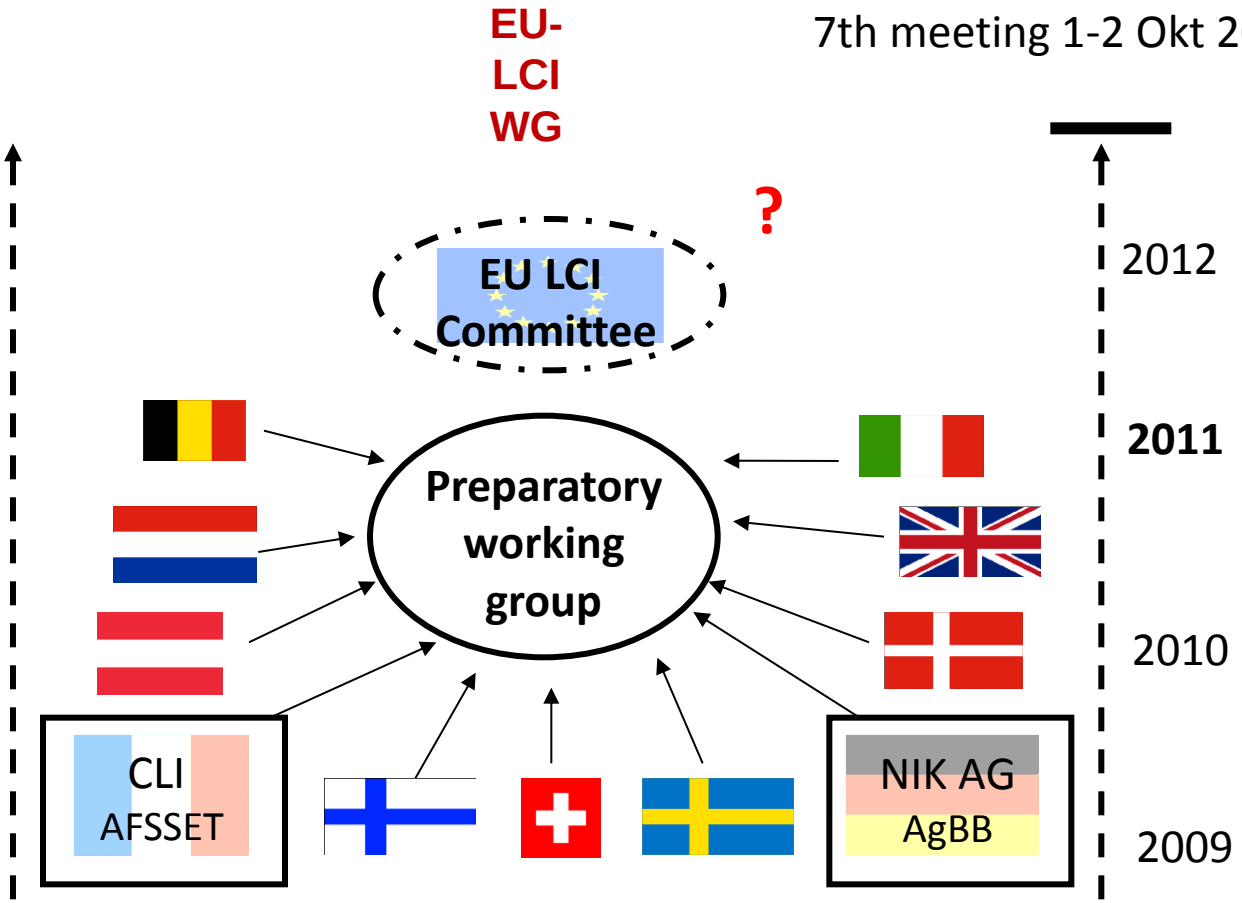


	Emission classes (µg/m³)				Results (µg/m³)
Substances	C	B	A	A+	
1,2,4-trimethylbenzene	> 2000	< 2000	< 1500	< 1000	8
Styrene	> 500	< 500	< 350	< 250	21
TVOC	> 2000	< 2000	< 1500	< 1000	404



Harmonisation of European LCI Values

7th meeting 1-2 Okt 2013 im UBA



Conclusions from AgBB experience

Fact is:

Indoor products (-groups) differ largely in their potential to influence indoor air quality. Low emission products have growing importance for low energy buildings.

- Mandatory and voluntary emission tests and control is effective in triggering low emission products. Hazardous substances can be excluded.
- *But for health protection of European consumers and simplifying orientation of manufacturers a harmonization in evaluation (with EU-LCI) and labelling needs to be tackled.*
- *A mandate from the Commision would be extremely helpful for the EU-LCI Group ready for take off…*

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Letter to the Comission, Nov. 2012

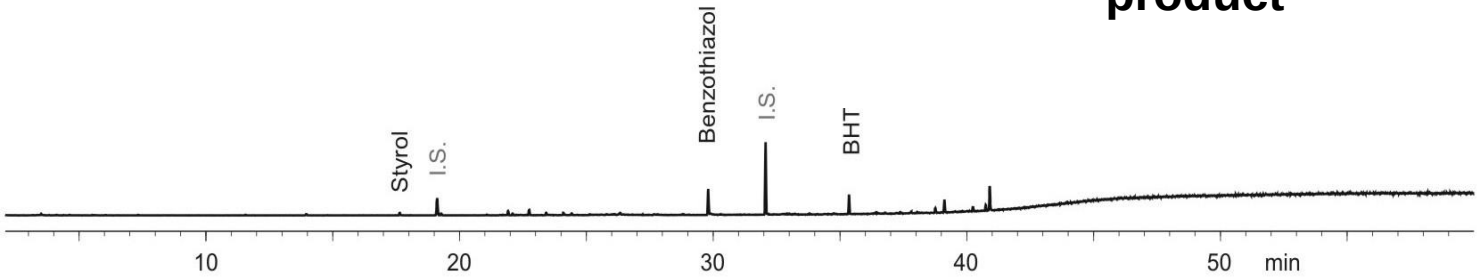
German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety, A. Nies:

„….I would encourage you (Commission) to take suitable measures to ensure that Member States do not in parallel develop any new national evaluation standards and may instead refer to these European LCI values as necessary. We believe that this requires a harmonized LCI list be available and published by the end of 2014. Such a list would also foster the implementation of the legally defined objectives concerning harmonization of the methods for the evaluation of building products."

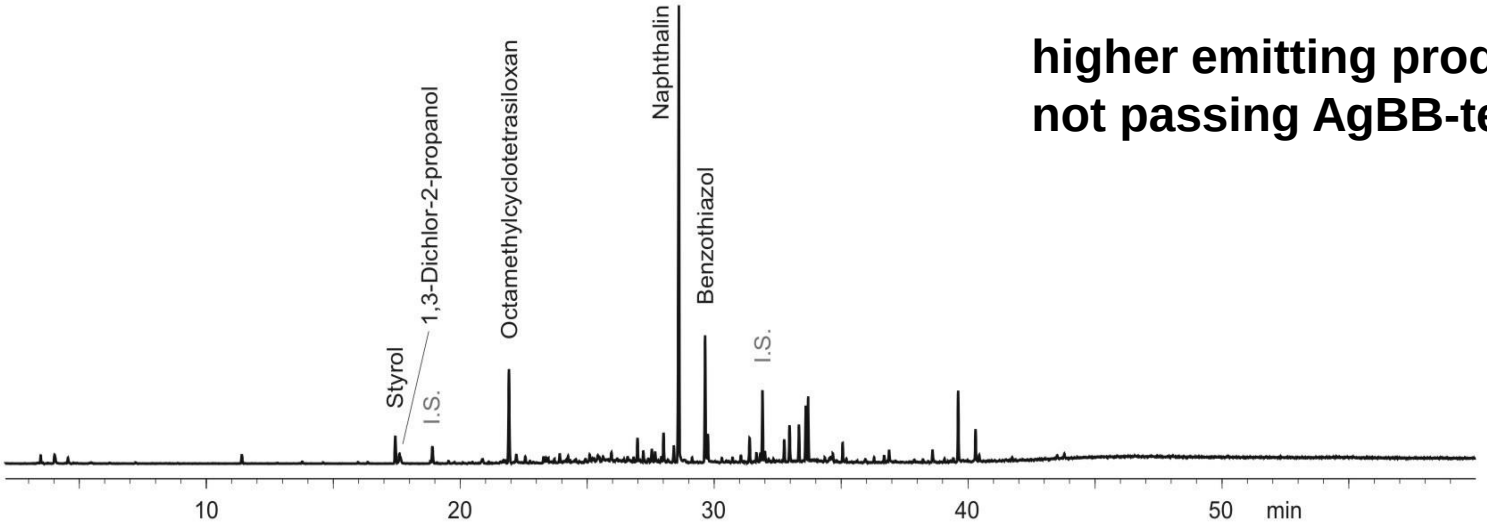
EU-LCI group - For contact: Christine Däumling, christine.daeumling@uba.de

Chromatogramms of rubber floorings

low emission product



higher emitting product, not passing AgBB-test



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German LCI-list in 2012

	Substanz	CAS Nr.	NIK [µg/m³]	EU-OEL [µg/m³]	TRGS 900 [µg/m³]	Bemerkungen[3)]
12-1	1,4-Dioxan	123-91-1	**73**	73.000	73.000	EU: Carc. 2
12-2	Caprolactam	105-60-2	**240**	10.000	5.000	Einzelstoffbetrachtung
12-3	N-Methyl-2-pyrrolidon	872-50-4	**400**	40.000	82.000	EU: Repr. 1B Einzelstoffbetrachtung
12-4	Octamethylcyclotetrasiloxan (D4)	556-67-2	**1.200**			EU: Repr. 2 Einzelstoffbetrachtung
12-5	Methenamin, Hexamethylentetramin (Formaldehydabspalter)	100-97-0	**30**			OEL Norwegen, Schweden: 3.000 µg/m³
12-6	2-Butanonoxim	96-29-7	**20**			EU: Carc. 2 Einzelstoffbetrachtung
12-7	Tributylphosphat	126-73-8				SVOC, EU: Carc. 2
12-8*	Triethylphosphat	78-40-0	**75**			vgl. Tributylphosphat (MAK-DFG 11.000 µg/m³); Umrechnung über Molgewicht
12-9	5-Chlor-2-methyl-4isothiazolin-3-on (CIT)	26172-55-4	**1**[#]			Einzelstoffbetrachtung
12-10	2-Methyl-4-isothiazolin-3-on (MIT)	2682-20-4	**100**			Einzelstoffbetrachtung
12-11	Triethylamin	121-44-8	**42**	8.400	4.200	
12-12	Decamethylcyclopentasiloxan (D5)	541-02-6	**1.500**			vgl. Octamethylcyclotetrasiloxan Umrechnung über Molgewicht
12-13	Dodecamethylcyclohexa-siloxan (D6)	540-97-6	**1.200**			vgl. Octamethylcyclotetrasiloxan Einzelstoffbetrachtung
12-14*	Tetrahydrofuran	109-99-9	**1.500**	150.000	150.000	
12-15*	Dimethylformamid	68-12-2	**15**			EU: Repr. 1B MAK-DFG: 15.000 µg/m³

Harmonisierungsinitiative zur Begrenzung der Emissionen aus Bauprodukten

Phase I
2007 - 2009

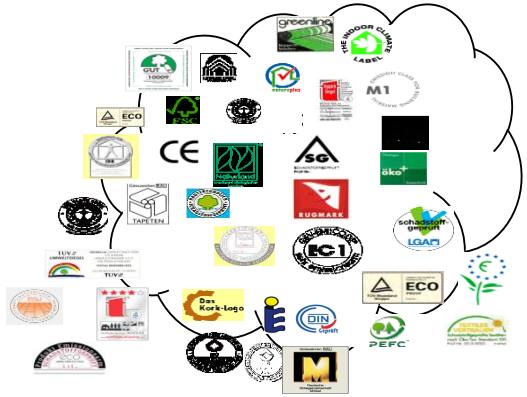
breeam
AgBB Committee for Health Evaluation of Building Products
THE INDOOR CLIMATE LABEL
EMISSION CLASS FOR BUILDING MATERIAL M1
afsset
JRC EUROPEAN COMMISSION
ihcp Institute for Health and Consumer Protection

Diskussion der Ergebnisse

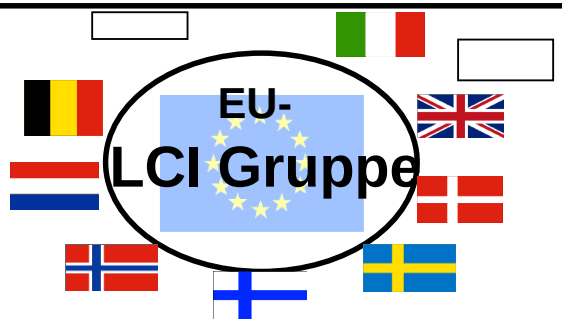
ECA Bericht 27

Phase II: 2010 - 2012?

Harmonisierung von Gütezeichen
Auftakt-Workshop 7./8. Juni 2010



Harmonisierung der gesundheitsbezogenen Emissionsbewertung mittels LCI Konzept
Auftakt-Workshop 13./14. September 2010



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Innenraumrichtwerte 2

Fortsetzung (folgt)	**Richtwert II** (mg/m^3)	**Richtwert I** (mg/m^3)	Festgelegt in
Monozyklische Monoterpene (Leitsubstanz **d-Limonen**)	**10**	**1**	2010
Benzylalkohol	**4**	**0,4**	2010
Benzaldehyd	**0,2**	**0,02**	2010
Zyklische Dimethylsiloxane D3 – D6 (Summenrichtwert)	**4**	**0,4**	2011
2-Furaldehyd	**0,1**	**0,01**	2011
Phenol	**0,2**	**0,02**	2011
Kresol	**0,05**	**0,005**	2012
2-Ethylhexanol	**1**	**0,1**	2012
Summe C9-C15 Alkylbenzole	**1**	**0,1**	2012
...			
MIBK Methylisobutylketon	**1**	**0,1**	2013
...Glykoläther...			2013

Weitere in Bearbeitung oder Planung: Butanonoxim, Benzothiazol, Dicarbonsäureester, Aromaten (C8 – C 15), C2-C3-Aldehyde, C2-C8 Alkansäuren….