Van Vuuren

Voor wie duurzaamheid gaat aantonen

BREEAM

Van Vuuren. Voor deurconcepten.

Versie 1.2.05.2021

Inhoudsopgave

BREEAM® NL

Projectniveau

BREEAM is een duurzaamheidsmethode die door de BRE in Engeland is gelanceerd. De Nederlandse BREEAM heet BREEAM-NL en is door de Dutch Green Building (DGBC) geïnitieerd. BREEAM maakt een beoordeling over het gehele project (gebouw).

BREEAM-NL beoordeelt een gebouw op negen categorieën:

1.	Management [MAN]	12%
2.	Gezondheid [HEA]	15%
3.	Energie [ENE]	19%
4.	Transport [TRA]	8%
5.	Water [WAT]	6%
6.	Materiaal [MAT]	12,5%
7.	Afval [WST]	7,5%
8.	Landgebruik en ecologie [LE]	10%
9.	Vervuiling [POL]	10%

De verschillende deelpercentages leiden samen tot een totaalscore welke wordt uitgedrukt in sterren:

★☆☆☆☆	pass	groter of gelijk 30%
★★☆☆☆	good	groter of gelijk 45%
★★★☆☆	very good	groter of gelijk 55%
★★★★☆	excellent	groter of gelijk 70%
★★★★★	outstanding	groter of gelijk 85%

Productniveau

Als deurenleverancier kunnen wij op productniveau een bijdrage leveren in een aantal van de categorieën. Tijdens de beoordeling van de producten van Van Vuuren is de meest recente versie van de BREEAM-NL beoordelingsrichtlijn 2014 versie 2 gehanteerd, met het bijbehorende interpretatiedocumenten.

Voor de deuren van Van Vuuren zijn BREEAM –NL haalbare credits de categorieën: Materiaal (MAT) en Gezondheid (HEA).
Met name zijn de volgende credits relevant:

- ✔ MAT 1 - Bouwmateriaal
- ✔ MAT 5 - Onderbouwde herkomst materiaal
- ✔ HEA 9 - Vluchtige organische verbindingen
- ✔ HEA 13 - Akoestiek

Deze relevante credits worden hierna per credit nader toegelicht.

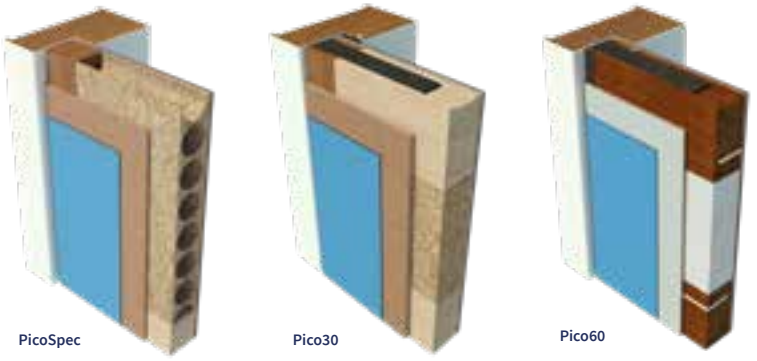
BREEAM

MAT 1 - Bouwmateriaal

In deze credit wordt de milieubelasting van het gehele gebouw bepaald. De beoordelingsmethode is beschreven in bijlage 1: LCA en EPD uitleg. BREEAM-NL credit MAT 1 berekent de schaduwkosten aan de hand van een eigen ontwikkelde tool, de DGBC materialentool. Als database voor deze tool wordt de NMD gebruikt.
Van Vuuren heeft een LCA berekening laten maken voor een drietal deuren.
De tabel hieronder met LCA berekeningen toont de resultaten.

LCA berekening

Typen	Schaduwkosten per m^2
PicoSpec	€ 0,85
Pico30	€ 1,65
Pico60	€ 1,89



Bijlage 1: LCA en EPD uitleg | **Bijlage 2:** Environmental Product Declaration | **Bijlage 3:** Productbladen PicoSpec, Pico30 en Pico60

MAT 5 - Onderbouwde herkomst materiaal

In deze credit wordt de herkomst van materialen voor de hoofdbouwdelen herleid en onderbouwd. BREEAM-NL credit MAT 5 berekent de score aan de hand van zogenaamde 'tier levels' in de DGBC materialen MAT 5 calculator.

Aandeel % van hout in de deur

Onderdeel	Gewicht kg.	Aandeel %	Tierlevel	Onderbouwing	Bewijs
Vlasvezelplaat	25,4 kg	59 %	1	FSC 100%	FSC-C028828
Meranti stijlen	1 kg	2,5 %	1	FSC 100%	CU-COC-802320
Vuren dorpel	1 kg	2,5 %	1	FSC 100%	FSCCO-13769
HDF board	11,2 kg	26 %	1	FSC 100%	IMOCOC-023069
HPL	4 kg	9 %	1	FSC 100%	TT-COC-003588
PVAc lijm	0,5 kg	1 %	-	-	-
Totaal	**43,1 kg**	**100%**			

Uit bovenstaande tabel blijkt dat 99% van de deur wordt onderbouwd met een FSC certificaat. Hiermee wordt optimaal (tier 1) bijgedragen binnen de credit MAT 5. De beoordeelde maatgevende deur bestaat uit diverse onderdelen. Deze tabel toont het percentuele aandeel in volumes en gewicht.

Bijlage 4: FSC certificaten

BREEAM

HEA 9 - Vluchtige organische verbindingen

Binnen deze credit wordt het deurengamma van Van Vuuren getoetst op de eisen van credit HEA 9: Vluchtige organische verbindingen. DGMR heeft voor van Vuuren Grou BV een analyse gemaakt van de materialen die toegepast worden in de deuren voor de Utiliteitsbouw. Op basis van de toegepaste halffabricaten kan het volgende worden vermeld:

HEA 9 - Vluchtige organische verbindingen

Onderdeel	Product	Vereiste certificering	Voldoet	Opmerking	Bijlage
Vulling					
Brandwerende vulling	Batiboard	E1 (formaldehyde)- EN 13986:2010	Ja	Emissions dans l'air interieur: A+ label (French VOC regulation)	5.1
Kanalenspaan Sauerland	Spaanplaat, Hout	E1 (formaldehyde)- EN 13986:2010	Ja	Voldoet aan E1. Getest conform DIBt richtlinie 100 norm	5.2 / 5.7
Unilin	Spaanplaat, Hout	E1 (formaldehyde)- EN 13986:2010	Ja	Conform EN 13986	5.3
Afwerking					
HDF Homanit Homadur	High Density Fiberboard, hout	E1 (formaldehyde)- EN 13986:2010	Ja	Voldoet aan E1. Getest conform DIBt richtlinie 100 norm	5.4 / 5.7
HPL laag Formica	Kunststof	Categorie E1 conform EN 14041:2004	Ja	Greenguard label	5.5
Algemeen					
Te verlijmen onderdelen tot eindproduct - Rakoll ECO3	Lijm	E1 (formaldehyde)- EN 14080:2005 Methode conform EN 717-1 / 717-2	Ja	Rapport met max. formaldehyde waarde van 0.1 ppm. Deze waarde is conform E1 (< 0.1ppm (0,124 mg/m^3)	5.6

Voor BREEAM wordt Volhout niet beoordeeld en valt daarom buiten de scope.

Bijlage 5: VOC-verklaringen leveranciers

BREEAM

HEA 13 - Akoestiek

Binnen deze credit wordt het deurengamma van Van Vuuren getoetst op de eisen van credit HEA 13 - Akoestiek.
Voor de producten van Van Vuuren is het relevant dat er getoetst wordt op het onderdeel luchtgeluidsisolatie.

Meerwaarde Van Vuuren

Onderstaande tabel toont de getoetste beschikbare deuren aan de luchtgeluidsisolatie eisen. Noemenswaardig is de eis van $D_{nT;A;k}$, die staat voor de luchtgeluidsisolatie tussen een scheidingsconstructie en die gecorrigeerd is voor de diepte van het vertrek. De waarden $R_{w;p}$ en $Dn_{T;A;k}$ kunnen niet één op één vergeleken worden, omdat dit sterk afhankelijk is van de ruimteafmetingen, de wanden, correcties e.d. Op basis van vuistregels is bepaald dat het verschil tussen $D_{nT;A;k}$ en $R_{w;p}$ 3dB is. Met dit verschil wordt ingeschat dat voor 90% van de situatie wordt voldaan. Van Vuuren levert een goede bijdrage aan deze credit. Wanneer meer gegevens bekend zijn, moet een specifieke beoordeling per eis plaatsvinden.

Beoordeling HEA 13 - Akoestiek

Gebruiksfunctie	$D_{nT;A;k}$ [dB]	Indicatieve eis deur $R_{w;p}$ [dB]	Voldoet
Kantoor			
Tussen verblijfsruimten	> 38*	Rw;p > 41dB + enkele kierdichting +Onderdorpel of valdorpel	Ja
Tussen verblijfsruimten met deur	> 33	Rw;p > 36dB + Massieve deur 38mm. enkele kierdichting + kier onderdeur < 3 mm	Ja
Onderwijs			
Tussen verblijfsruimten	> 38*	Rw;p > 41dB + enkele kierdichting +Onderdorpel of valdorpel	Ja
Tussen theorielokalen onderling	> 42*	Rw;p > 45dB + dubbele kierdichting + Onderdorpel of valdorpel	Ja
Woningen			
Tussen verblijfsruimten	> 32*	Rw;p > 45dB + Massieve deur 38mm. enkele kierdichting + kier onderdeur < 3 mm	Ja
Logies			
Tussen alle logiesfuncties en aangrenzende verblijfsruimten	> 38*	Rw;p > 41dB + enkele kierdichting + Onderdorpel of valdorpel	Ja
Bijeenkomst-kinderopvang			
Tussen verblijfsruimten	> 38*	Rw;p > 41dB + enkele kierdichting + Onderdorpel of valdorpel	Ja
Tussen verblijfsruimten	> 38*	Rw;p > 41dB + enkele kierdichting + Onderdorpel of valdorpel	Ja
Bijeenkomst / Vergaderruimte			
Tussen alle vergaderruimte en aangrenzende verblijfsruimten	> 42*	Rw;p > 45dB + dubbele kierdichting + Onderdorpel of valdorpel	Ja

Bijlage 1

LCA en EPD toelichting

LCA en EPD toelichting

Life Cycle Analysis (LCA)

Met een Life Cycle Analysis (LCA) wordt over de gehele productketen - over alle levensfase van het te beoordelen product - de milieu effecten in kaart gebracht. Een LCA-berekening geeft geen oordeel, maar maakt enkel de milieueffecten van het product getalsmatig inzichtelijk. Met behulp van grote databases is het mogelijk de milieueffecten uit te drukken in een fictieve eenheid 'euro's'. Dit zijn kosten die we doorgeven aan de toekomstige generatie. In Nederland wordt de de Nationale Milieu Database (NMD) en Ecoinvent gebruikt als achtergrond- database voor LCA-berekeningen. De LCA wordt opgesteld conform ISO14040/14040.

Het resultaat van een LCA geeft op gebouwniveau schaduwkosten in € per m2 Bruto Vloer Oppervlak (BVO), dit wordt kortweg de milieuprestatie gebouw (MPG) genoemd. De MPG wordt bepaald door verschillende in de markt te verkrijgen tools als: Greencalc+, DGBC Materialentool, MRPI MPG software en GPR.

Van Vuuren heeft voor een drietal deuren een LCA berekening laten opstellen en het resultaat wordt verwerkt in de aankomende versie van de Nationale Milieu Database, die een release datum heeft van 10 november 2017. De profielen van Van Vuuren zullen vervolgens zichtbaar en te selecteren zijn in de hieraan gekoppelde LCA tools, zoals: DGBC Materialentool, MPRI Software en GPR.

Environmental Product Declaration (EPD)

Europa ontwikkelt zich ook op het gebied van LCA en zo is er nu de EPD, een Environmental Product Declaration.
Een EPD is een milieulabel dat gebaseerd is op de Levens Cyclus Analyse (LCA) en geeft een certificering volgens DIN en ISO 14025 (type III Milieuverklaringen). De EPD betrekt alle relevante milieuaspecten van een product, van de oorsprong van grondstoffen en materialen tot en met gegevens over productie- en verwerking, tests en documentatie.

Op basis van de LCA berekening heeft Van Vuuren voor een drietal deuren een EPD laten opstellen.

Beoordeelde deuren met schaduwkosten per m²

Typen	Dikte	Type	Gewicht (kg.)	Schaduwkosten per m²
PicoSpec	38 mm.	Standaard utiliteit deur	9,02 kg/m²	€ 0,85
Pico30	40 mm.	30 min. brandwerende deur	21,01 kg/m²	€ 1,65
Pico60	40 mm.	60 min. brandwerende deur	18,22 kg/m²	€ 1,89

Bijlage 2

Environmental Product Declaration

PicoSpec - Environmental Product Declaration

ENVIRONMENTAL PRODUCT DECLARATION
According ISO 14025 and EN 15804

Van Vuuren

NIBE

Picopré

COMPANY INFORMATION / DECLARATION OWNER

Manufacturer:	Van Vuuren
Production Location:	Grou
Address:	J.W. de Visserwei 5 9001 ZE Grou
E-mail:	sales@vanvuuren.nl
Website:	http://www.vanvuuren.nl

EPD INFORMATION

Calculation number:	EPD-NIBE-20170426-761
Date of issue:	June 1th 2017
End of validity:	June 1th 2022
Version Application:	V1.0
Version database:	v2.57 (2017-06-29)
PCR:	SBK bepalingsmethode v2.0

VERIFICATION OF THE DECLARATION

CEN standard EN 15804:2012 serves as the core PCR
Independent verification of the declaration. according to EN ISO 14025:2010. Internal ☑ External

Het dossier zoals ontvangen van NIBE op 8 mei 2017 en aangevuld op 15 en 19 juni is finaal getoetst en voldoet aan de eisen van de Bepalingsmethode. Het dossier bestond per product uit het rapport en het Invoersheets NMD (basisprofiel en productkaartinformatie). De toetsingstabellen uit het Toetsingsprotocol zijn als apart document (PICO 30-60-pre 25011.16.03.014 - SBK VerifProt 2.0 – NIBE EPD tool online version 1.1.pdf) bij afronding van deze toetsing opgeleverd.

Harry van Ewijk, SGS Search Consultancy BV, 26 juni 2017

FUNCTIONAL UNIT / DECLARED UNIT

Binnendeuren
Een binnendeur van 930x2315mm, die voldoet aan de eisen uit het bouwbesluit. Afwerkingen en onderhoud dienen meegenomen te worden. De hoeveelheden zijn teruggerekend tot 1 m². Bevestigingsmaterialen en hang- en sluitwerk, kozijnen en stelkozijnenvallen buiten de beschouwing. Voor het opstellen van de LCA is er niet gebruik gemaakt van een PCR, omdat er op het moment van het opstellen van de LCA geen geschikte PCR voor het product beschikbaar is.

SCOPE OF THE DECLARATION

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	MND	MND	MND	MND	MND	X	MND	X	X

(X = included, MND = module not declared)

PRODUCT DESCRIPTION

De Picopré is een standaard utiliteitsdeur.

PicoSpec - Environmental Product Declaration

RESULTS

Impact category	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C2	C4	D	Total
ADPE	kg Sb eq.	1.31E-5	4.86E-6	6.32E-6	7.60E-7	1.30E-6	0.00E+0	0.00E+0	0.00E+0	1.11E-6	2.49E-7	-4.66E-7	2.72E-5
ADPF	kg Sb eq.	9.65E-2	1.21E-2	3.94E-2	1.89E-3	2.92E-3	0.00E+0	0.00E+0	0.00E+0	2.76E-3	1.58E-3	-8.82E-2	6.90E-2
GWP	kg CO_2eq.	1.14E+1	1.67E+0	5.03E+0	2.61E-1	3.56E-1	0.00E+0	0.00E+0	0.00E+0	3.82E-1	2.86E-1	-1.10E+1	8.41E+0
ODP	kg CFK-11 eq.	1.12E-6	2.68E-7	2.40E-7	4.19E-8	4.59E-8	0.00E+0	0.00E+0	0.00E+0	6.12E-8	2.69E-8	-7.76E-7	1.03E-6
POCP	kg ethene eq.	8.04E-3	1.23E-3	9.78E-4	1.92E-4	5.03E-4	0.00E+0	0.00E+0	0.00E+0	2.81E-4	7.70E-4	-1.40E-3	1.06E-2
AP	kg SO_2 eq.	3.70E-2	9.03E-3	9.13E-3	1.41E-3	2.44E-3	0.00E+0	0.00E+0	0.00E+0	2.06E-3	4.04E-3	-1.32E-2	5.19E-2
EP	Kg PO_4^{3-} eq.	1.26E-2	2.07E-3	2.47E-3	3.23E-4	8.04E-4	0.00E+0	0.00E+0	0.00E+0	4.72E-4	1.05E-3	-2.81E-3	1.70E-2
HTP	kg 1,4 DB eq.	4.64E+0	4.84E-1	1.24E+0	7.57E-2	2.76E-1	0.00E+0	0.00E+0	0.00E+0	1.11E-1	4.82E-1	-1.43E+0	5.87E+0
FAETP	kg 1,4 DB eq.	1.69E-1	2.06E-2	2.49E-2	3.23E-3	1.14E-2	0.00E+0	0.00E+0	0.00E+0	4.71E-3	2.59E-2	-1.99E-2	2.40E-1
MAETP	kg 1,4 DB eq.	5.89E+2	8.47E+1	3.00E+2	1.32E+1	1.85E+1	0.00E+0	0.00E+0	0.00E+0	1.93E+1	2.16E+1	-6.07E+2	4.39E+2
TETP	kg 1,4 DB eq.	6.24E-2	5.46E-3	6.13E-2	8.54E-4	6.28E-3	0.00E+0	0.00E+0	0.00E+0	1.25E-3	2.65E-3	-7.95E-3	1.32E-1
Para-meter	**Unit**	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**C2**	**C4**	**D**	**Total**
PERE	MJ	4.62E+2	3.49E-1	2.67E+1	5.46E-2	2.42E+1	0.00E+0	0.00E+0	0.00E+0	7.97E-2	5.85E-2	-5.48E+0	5.08E+2
PERM	MJ	-	-	-	-	-	-	-	-	-	-	-	-
PERT	MJ	4.62E+2	3.49E-1	2.67E+1	5.46E-2	2.42E+1	0.00E+0	0.00E+0	0.00E+0	7.97E-2	5.85E-2	-5.48E+0	5.08E+2
PENRE	MJ	2.32E+2	2.81E+1	8.43E+1	4.38E+0	7.82E+0	0.00E+0	0.00E+0	0.00E+0	6.40E+0	3.49E+0	-1.86E+2	1.80E+2
PENRM	MJ	-	-	-	-	-	-	-	-	-	-	-	-
PENRT	MJ	2.32E+2	2.81E+1	8.43E+1	4.38E+0	7.82E+0	0.00E+0	0.00E+0	0.00E+0	6.40E+0	3.49E+0	-1.86E+2	1.80E+2
SM	kg	-	-	-	-	-	-	-	-	-	-	-	-
RSF	MJ	-	-	-	-	-	-	-	-	-	-	-	-
NRSF	MJ	-	-	-	-	-	-	-	-	-	-	-	-
FW	m^3	3.95E+1	2.03E+0	5.05E+0	3.17E-1	2.14E+0	0.00E+0	0.00E+0	0.00E+0	4.63E-1	3.76E-1	-4.57E+0	4.54E+1
HWD	kg	-	-	-	-	-	-	-	-	-	-	-	-
NHWD	kg	-	-	-	-	-	-	-	-	-	-	-	-
RWD	kg	5.49E-4	2.08E-5	1.33E-4	3.26E-6	2.55E-5	0.00E+0	0.00E+0	0.00E+0	4.76E-6	3.37E-6	-1.88E-4	5.52E-4
CRU	kg	-	-	-	-	-	-	-	-	-	-	-	-
MFR	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.04E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.04E-3
MER	kg	-	-	-	-	-	-	-	-	-	-	-	-
EE	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.78E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.77E+1	9.25E+1
SP	**s€**	**s€ 1,35**	**s€ 0,20**	**s€ 0,43**	**s€ 0,03**	**s€ 0,06**	**s€ 0,00**	**s€ 0,00**	**s€ 0,00**	**s€ 0,04**	**s€ 0,09**	**s€ -0,84**	**s€ 1,36**

Impact categories: ADPE=Depletion of abiotic resources-elements | **ADPF**=Depletion of abiotic resources-fossil fuels | **GWP**=Global warming | **ODP**=Ozone layer depletion | **POCP**=Photochemical oxidants creation | **AP**=Acidification of soil and water | **EP**=Eutrophication | **HTP**=Human toxicity | **FAETP**=Ecotoxicity. fresh water | **MAETP**=Ecotoxicity. marine water | **TETP**=Ecotoxicity. Terrestric

Parameters: PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water | **HWD**=hazardous waste disposed | **NHWD**=non hazardous waste disposed | **RWD**=radioactive waste disposed | **CRU**=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EE**=Exported energy | **SP**=Shadow Price |

Pico30 - Environmental Product Declaration

ENVIRONMENTAL PRODUCT DECLARATION
According ISO 14025 and EN 15804

Van Vuuren

NIBE

PICO 30

COMPANY INFORMATION / DECLARATION OWNER

Manufacturer: Van Vuuren
Production Location: Grou
Address: J.W. de Visserwei 5
9001 ZE Grou
E-mail: sales@vanvuuren.nl
Website: http://www.vanvuuren.nl

EPD INFORMATION

Calculation number: EPD-NIBE-20170426-754
Date of issue: June 1th 2017
End of validity: June 1th 2022
Version Application: V1.0
Version database: v2.57 (2017-06-29)
PCR: SBK bepalingsmethode v2.0

VERIFICATION OF THE DECLARATION

CEN standard EN 15804:2012 serves as the core PCR
Independent verification of the declaration. according to EN ISO 14025:2010. Internal ☑ External

Het dossier zoals ontvangen van NIBE op 8 mei 2017 en aangevuld op 15 en 19 juni is finaal getoetst en voldoet aan de eisen van de Bepalingsmethode. Het dossier bestond per product uit het rapport en het Invoersheets NMD (basisprofiel en productkaartinformatie). De toetsingstabellen uit het Toetsingsprotocol zijn als apart document (PICO 30-60-pre 25011.16.03.014 - SBK VerifProt 2.0 – NIBE EPD tool online version 1.1.pdf) bij afronding van deze toetsing opgeleverd.

Harry van Ewijk, SGS Search Consultancy BV, 26 juni 2017

FUNCTIONAL UNIT / DECLARED UNIT

Binnendeuren
Een binnendeur van 930x2315mm, die voldoet aan de eisen uit het bouwbesluit. Afwerkingen en onderhoud dienen meegenomen te worden. De hoeveelheden zijn teruggerekend tot 1 m². Bevestigingsmaterialen en hang- en sluitwerk, kozijnen en stelkozijnenvallen buiten de beschouwing. Voor het opstellen van de LCA is er niet gebruik gemaakt van een PCR, omdat er op het moment van het opstellen van de LCA geen geschikte PCR voor het product beschikbaar is.

SCOPE OF THE DECLARATION

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	MND	MND	MND	MND	MND	X	MND	X	X

(X = included, MND = module not declared)

PRODUCT DESCRIPTION

De Pico 30 is een 30 minuten brandwerende utiliteitsdeur.

Pico30 - Environmental Product Declaration

RESULTS

Impact category	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C2	C4	D	Total
ADPE	kg Sb eq.	4.23E-5	1.18E-5	8.15E-6	1.68E-6	3.30E-6	0.00E+0	0.00E+0	0.00E+0	2.44E-6	5.60E-7	-9.40E-7	6.93E-5
ADPF	kg Sb eq.	1.99E-1	2.93E-2	4.51E-2	4.18E-3	5.06E-3	0.00E+0	0.00E+0	0.00E+0	6.07E-3	3.57E-3	-1.78E-1	1.14E-1
GWP	kg CO_2eq.	2.09E+1	4.06E+0	5.61E+0	5.79E-1	4.75E-1	0.00E+0	0.00E+0	0.00E+0	8.41E-1	7.11E-1	-2.22E+1	1.09E+1
ODP	kg CFK-11 eq.	2.24E-6	6.50E-7	3.16E-7	9.28E-8	9.35E-8	0.00E+0	0.00E+0	0.00E+0	1.35E-7	6.13E-8	-1.57E-6	2.02E-6
POCP	kg ethene eq.	1.56E-2	2.99E-3	1.49E-3	4.26E-4	9.97E-4	0.00E+0	0.00E+0	0.00E+0	6.19E-4	1.71E-3	-2.83E-3	2.10E-2
AP	kg SO_2 eq.	8.60E-2	2.19E-2	1.28E-2	3.13E-3	5.50E-3	0.00E+0	0.00E+0	0.00E+0	4.54E-3	8.84E-3	-2.67E-2	1.16E-1
EP	Kg PO_4^{3-} eq.	1.91E-2	5.02E-3	2.95E-3	7.16E-4	1.27E-3	0.00E+0	0.00E+0	0.00E+0	1.04E-3	2.39E-3	-5.68E-3	2.68E-2
HTP	kg 1,4 DB eq.	1.19E+1	1.17E+0	1.62E+0	1.68E-1	6.62E-1	0.00E+0	0.00E+0	0.00E+0	2.43E-1	1.05E+0	-2.89E+0	1.40E+1
FAETP	kg 1,4 DB eq.	4.77E-1	5.01E-2	4.08E-2	7.14E-3	2.99E-2	0.00E+0	0.00E+0	0.00E+0	1.04E-2	5.43E-2	-4.01E-2	6.29E-1
MAETP	kg 1,4 DB eq.	1.70E+3	2.05E+2	3.62E+2	2.93E+1	5.57E+1	0.00E+0	0.00E+0	0.00E+0	4.26E+1	4.80E+1	-1.23E+3	1.22E+3
TETP	kg 1,4 DB eq.	1.59E-1	1.33E-2	6.65E-2	1.89E-3	1.16E-2	0.00E+0	0.00E+0	0.00E+0	2.75E-3	5.81E-3	-1.60E-2	2.45E-1
Para-meter	**Unit**	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**C2**	**C4**	**D**	**Total**
PERE	MJ	9.68E+2	8.47E-1	5.11E+1	1.21E-1	5.04E+1	0.00E+0	0.00E+0	0.00E+0	1.75E-1	1.31E-1	-1.11E+1	1.06E+3
PERM	MJ	-	-	-	-	-	-	-	-	-	-	-	-
PERT	MJ	9.68E+2	8.47E-1	5.11E+1	1.21E-1	5.04E+1	0.00E+0	0.00E+0	0.00E+0	1.75E-1	1.31E-1	-1.11E+1	1.06E+3
PENRE	MJ	4.69E+2	6.80E+1	9.74E+1	9.71E+0	1.37E+1	0.00E+0	0.00E+0	0.00E+0	1.41E+1	7.88E+0	-3.75E+2	3.04E+2
PENRM	MJ	-	-	-	-	-	-	-	-	-	-	-	-
PENRT	MJ	4.69E+2	6.80E+1	9.74E+1	9.71E+0	1.37E+1	0.00E+0	0.00E+0	0.00E+0	1.41E+1	7.88E+0	-3.75E+2	3.04E+2
SM	kg	-	-	-	-	-	-	-	-	-	-	-	-
RSF	MJ	-	-	-	-	-	-	-	-	-	-	-	-
NRSF	MJ	-	-	-	-	-	-	-	-	-	-	-	-
FW	m^3	6.48E+1	4.92E+0	6.33E+0	7.03E-1	3.45E+0	0.00E+0	0.00E+0	0.00E+0	1.02E+0	8.38E-1	-9.23E+0	7.28E+1
HWD	kg	-	-	-	-	-	-	-	-	-	-	-	-
NHWD	kg	-	-	-	-	-	-	-	-	-	-	-	-
RWD	kg	8.91E-4	5.05E-5	1.49E-4	7.21E-6	3.60E-5	0.00E+0	0.00E+0	0.00E+0	1.05E-5	7.57E-6	-3.79E-4	7.73E-4
CRU	kg	-	-	-	-	-	-	-	-	-	-	-	-
MFR	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.32E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.84E-1	8.27E-1
MER	kg	-	-	-	-	-	-	-	-	-	-	-	-
EE	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.25E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.77E+2	1.86E+2
SP	**s€**	**s€ 0,48**	**s€ 0,07**	**s€ 0,12**	**s€ 0,00**	**s€ 0,00**	**s€ 0,00**	**s€ 0,10**	**s€ 0,20**	**s€ -1,69**	**s€ 2,65**	**s€ 2,89**	**s€ 0,47**

Impact categories: ADPE=Depletion of abiotic resources-elements | **ADPF**=Depletion of abiotic resources-fossil fuels | **GWP**=Global warming | **ODP**=Ozone layer depletion | **POCP**=Photochemical oxidants creation | **AP**=Acidification of soil and water | **EP**=Eutrophication | **HTP**=Human toxicity | **FAETP**=Ecotoxicity. fresh water | **MAETP**=Ecotoxicity. marine water | **TETP**=Ecotoxicity. Terrestric

Parameters: PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water | **HWD**=hazardous waste disposed | **NHWD**=non hazardous waste disposed | **RWD**=radioactive waste disposed | **CRU**=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EE**=Exported energy | **SP**=Shadow Price |

Pico60 - Environmental Product Declaration

ENVIRONMENTAL PRODUCT DECLARATION
According ISO 14025 and EN 15804

Van Vuuren

NIBE EXPERTS IN SUSTAINABILITY

PICO 60

COMPANY INFORMATION / DECLARATION OWNER

Manufacturer:	Van Vuuren
Production Location:	Grou
Address:	J.W. de Visserwei 5 9001 ZE Grou
E-mail:	sales@vanvuuren.nl
Website:	http://www.vanvuuren.nl

EPD INFORMATION

Calculation number:	EPD-NIBE-20170426-760
Date of issue:	June 1th 2017
End of validity:	June 1th 2022
Version Application:	V1.0
Version database:	v2.57 (2017-06-29)
PCR:	SBK bepalingsmethode v2.0

VERIFICATION OF THE DECLARATION

CEN standard EN 15804:2012 serves as the core PCR
Independent verification of the declaration. according to EN ISO 14025:2010. Internal ☑ External

Het dossier zoals ontvangen van NIBE op 8 mei 2017 en aangevuld op 15 en 19 juni is finaal getoetst en voldoet aan de eisen van de Bepalingsmethode. Het dossier bestond per product uit het rapport en het Invoersheets NMD (basisprofiel en productkaartinformatie). De toetsingstabellen uit het Toetsingsprotocol zijn als apart document (PICO 30-60-pre 25011.16.03.014 - SBK VerifProt 2.0 – NIBE EPD tool online version 1.1.pdf) bij afronding van deze toetsing opgeleverd.

Harry van Ewijk, SGS Search Consultancy BV, 26 juni 2017

FUNCTIONAL UNIT / DECLARED UNIT

Binnendeuren
Een binnendeur van 930x2315mm, die voldoet aan de eisen uit het bouwbesluit. Afwerkingen en onderhoud dienen meegenomen te worden. De hoeveelheden zijn teruggerekend tot 1 m². Bevestigingsmaterialen en hang- en sluitwerk, kozijnen en stelkozijnenvallen buiten de beschouwing. Voor het opstellen van de LCA is er niet gebruik gemaakt van een PCR, omdat er op het moment van het opstellen van de LCA geen geschikte PCR voor het product beschikbaar is.

SCOPE OF THE DECLARATION

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	MND	MND	MND	MND	MND	X	MND	X	X

(X = included, MND = module not declared)

PRODUCT DESCRIPTION

De Pico 60 is een 60 minuten brandwerende utiliteitsdeur.

Pico60 - Environmental Product Declaration

RESULTS

Impact category	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C2	C4	D	Total
ADPE	kg Sb eq.	1.11E-3	9.49E-6	6.13E-5	1.54E-6	5.91E-5	0.00E+0	0.00E+0	0.00E+0	2.23E-6	5.16E-7	-8.54E-7	1.24E-3
ADPF	kg Sb eq.	2.04E-1	3.63E-2	4.64E-2	3.84E-3	6.50E-3	0.00E+0	0.00E+0	0.00E+0	5.55E-3	3.28E-3	-1.62E-1	1.44E-1
GWP	kg CO_2eq.	2.51E+1	5.19E+0	5.96E+0	5.31E-1	8.64E-1	0.00E+0	0.00E+0	0.00E+0	7.68E-1	8.34E-1	-2.02E+1	1.91E+1
ODP	kg CFK-11 eq.	3.77E-6	7.37E-7	4.07E-7	8.51E-8	1.85E-7	0.00E+0	0.00E+0	0.00E+0	1.23E-7	5.65E-8	-1.42E-6	3.94E-6
POCP	kg ethene eq.	1.53E-2	4.64E-3	1.76E-3	3.91E-4	1.08E-3	0.00E+0	0.00E+0	0.00E+0	5.65E-4	1.57E-3	-2.57E-3	2.28E-2
AP	kg SO_2 eq.	1.01E-1	6.07E-2	1.72E-2	2.87E-3	8.45E-3	0.00E+0	0.00E+0	0.00E+0	4.15E-3	8.10E-3	-2.42E-2	1.78E-1
EP	Kg PO_4^{3-} eq.	2.30E-2	7.89E-3	3.45E-3	6.57E-4	1.64E-3	0.00E+0	0.00E+0	0.00E+0	9.50E-4	2.20E-3	-5.16E-3	3.46E-2
HTP	kg 1,4 DB eq.	1.20E+1	2.37E+0	1.75E+0	1.54E-1	7.39E-1	0.00E+0	0.00E+0	0.00E+0	2.22E-1	9.67E-1	-2.62E+0	1.56E+1
FAETP	kg 1,4 DB eq.	4.40E-1	6.52E-2	4.16E-2	6.55E-3	2.88E-2	0.00E+0	0.00E+0	0.00E+0	9.48E-3	4.98E-2	-3.64E-2	6.05E-1
MAETP	kg 1,4 DB eq.	1.38E+3	3.33E+2	3.59E+2	2.69E+1	5.11E+1	0.00E+0	0.00E+0	0.00E+0	3.89E+1	4.51E+1	-1.11E+3	1.12E+3
TETP	kg 1,4 DB eq.	1.25E-1	1.64E-2	6.55E-2	1.73E-3	1.01E-2	0.00E+0	0.00E+0	0.00E+0	2.51E-3	5.33E-3	-1.46E-2	2.12E-1
Para-meter	**Unit**	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**C2**	**C4**	**D**	**Total**
PERE	MJ	5.49E+2	1.12E+0	3.58E+1	1.11E-1	2.88E+1	0.00E+0	0.00E+0	0.00E+0	1.60E-1	1.21E-1	-1.00E+1	6.05E+2
PERM	MJ	-	-	-	-	-	-	-	-	-	-	-	-
PERT	MJ	5.49E+2	1.12E+0	3.58E+1	1.11E-1	2.88E+1	0.00E+0	0.00E+0	0.00E+0	1.60E-1	1.21E-1	-1.00E+1	6.05E+2
PENRE	MJ	5.10E+2	8.47E+1	1.02E+2	8.91E+0	1.84E+1	0.00E+0	0.00E+0	0.00E+0	1.29E+1	7.25E+0	-3.41E+2	4.03E+2
PENRM	MJ	-	-	-	-	-	-	-	-	-	-	-	-
PENRT	MJ	5.10E+2	8.47E+1	1.02E+2	8.91E+0	1.84E+1	0.00E+0	0.00E+0	0.00E+0	1.29E+1	7.25E+0	-3.41E+2	4.03E+2
SM	kg	-	-	-	-	-	-	-	-	-	-	-	-
RSF	MJ	-	-	-	-	-	-	-	-	-	-	-	-
NRSF	MJ	-	-	-	-	-	-	-	-	-	-	-	-
FW	m^3	9.76E+1	6.39E+0	8.32E+0	6.44E-1	5.30E+0	0.00E+0	0.00E+0	0.00E+0	9.32E-1	7.70E-1	-8.38E+0	1.12E+2
HWD	kg	-	-	-	-	-	-	-	-	-	-	-	-
NHWD	kg	-	-	-	-	-	-	-	-	-	-	-	-
RWD	kg	1.18E-3	7.79E-5	1.69E-4	6.61E-6	5.47E-5	0.00E+0	0.00E+0	0.00E+0	9.57E-6	6.97E-6	-3.44E-4	1.16E-3
CRU	kg	-	-	-	-	-	-	-	-	-	-	-	-
MFR	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.32E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.84E-1	8.27E-1
MER	kg	-	-	-	-	-	-	-	-	-	-	-	-
EE	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.44E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.61E+2	1.69E+2
SP	**s€**	**s€ 3,17**	**s€ 0,84**	**s€ 0,53**	**s€ 0,06**	**s€ 0,16**	**s€ 0,00**	**s€ 0,00**	**s€ 0,00**	**s€ 0,09**	**s€ 0,19**	**s€ -1,53**	**s€ 3,51**

Impact categories: ADPE=Depletion of abiotic resources-elements | **ADPF**=Depletion of abiotic resources-fossil fuels | **GWP**=Global warming | **ODP**=Ozone layer depletion | **POCP**=Photochemical oxidants creation | **AP**=Acidification of soil and water | **EP**=Eutrophication | **HTP**=Human toxicity | **FAETP**=Ecotoxicity. fresh water | **MAETP**=Ecotoxicity. marine water | **TETP**=Ecotoxicity. Terrestric

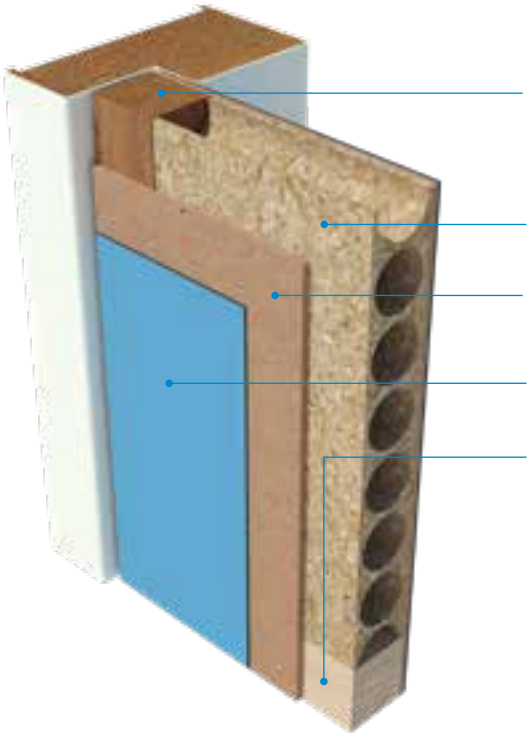
Parameters: PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water | **HWD**=hazardous waste disposed | **NHWD**=non hazardous waste disposed | **RWD**=radioactive waste disposed | **CRU**=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EE**=Exported energy | **SP**=Shadow Price |

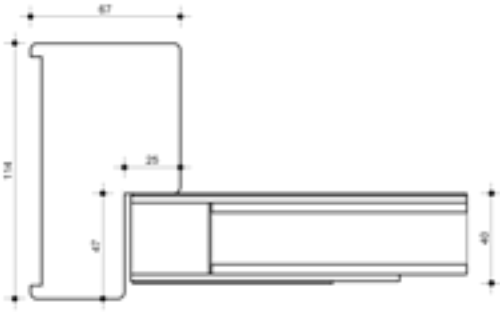
Bijlage 3

Productbladen

PicoSpec

Standaard utiliteitsdeur • HPL





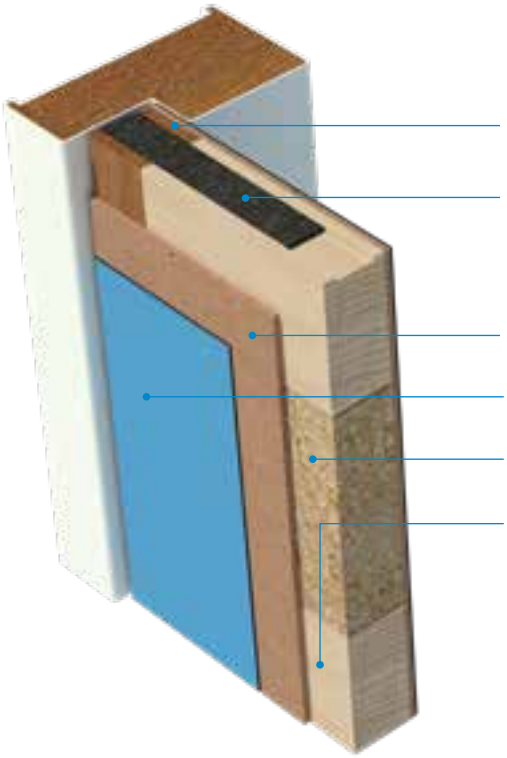
Standaard:

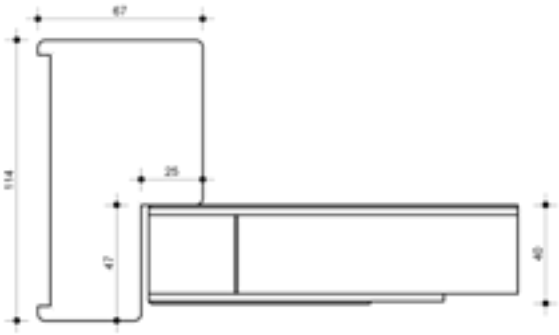
Optioneel:

	Enkele deur	Dubbele deur
Deurbladdikte	HPL: 40 mm / 54 mm	HPL: 40 mm / 54 mm
Gewicht	Ca. 18 kg/m² (40 mm deur) / 26 kg/m² (54 mm deur)	Ca. 18 kg/m² (40 mm deur) / 26 kg/m² (54 mm deur)
Maximale hoogte	2980 mm	2980 mm
Maximale breedte	1280 mm	1280 mm
Maximale oppervlak	N.v.t.	N.v.t.
Maximale ruimte onder de deur	N.v.t.	N.v.t.
Bovenpaneel	Optioneel	Optioneel
Vuurzijde	N.v.t.	N.v.t.
Aanslagsponning kozijn	17-25 mm	17-25 mm
Aanslagrubber kozijn	N.v.t.	N.v.t.
Uitvoering	Stomp / Opdek / Indek (54 mm)	Stomp / Opdek / Indek (54 mm)
Kantafwerking	Onbehandeld, gelakt, geschilderd, kunststof ABS (2 mm)	Onbehandeld, gelakt, geschilderd, scharnierzijde ABS (2 mm)
Brandwerend	Nee	Nee
Rookwerend	Optioneel Sa / S200	Optioneel Sa / S200
Geluidwerend	Optioneel 35 - 42dB	Optioneel 35 - 42dB
In- en uitbraakwerend	Optioneel RC2	Optioneel RC2
Klimaatklasse	Optioneel klimaat A / B / C	Optioneel klimaat A / B / C
MVO	Optioneel FSC	Optioneel FSC
GND	Optioneel GND label	Optioneel GND label
Glasopening	40 mm en 54 mm mogelijk met volspaanvulling	40 mm en 54 mm mogelijk met volspaanvulling
Hang- en sluitwerk	Optioneel	Optioneel
Kozijntype	Hout / Staal	Hout / Staal

Pico30

Brandwerende utiliteitsdeur • HPL





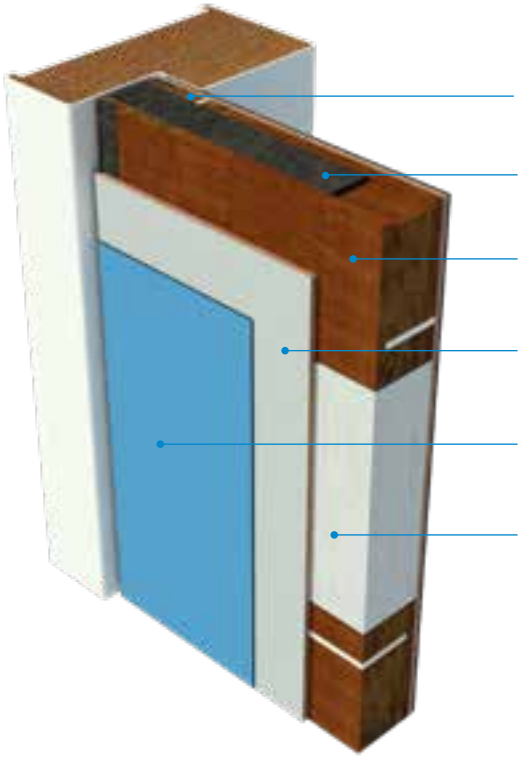
Standaard:

Optioneel:

	Enkele deur	Dubbele deur
Deurbladdikte	HPL: 40 mm	HPL: 54 mm
Gewicht	Ca. 21 kg/m² (40 mm deur) / 26 kg/m² (54 mm deur)	Ca. 21 kg/m² (40 mm deur) / 26 kg/m² (54 mm deur)
Maximale hoogte	2825 mm	2700 mm
Maximale breedte	1472 mm	1280 mm
Maximale oppervlak	3,86 m²	N.v.t.
Maximale ruimte onder de deur	6 mm	6 mm
Bovenpaneel	Toegestaan, zie productblad bovenpaneel	Optioneel
Vuurzijde	Draaiend naar het vuur toe en van het vuur af	N.v.t.
Aanslagsponning kozijn	Houten kozijn: VM 450 kg/m³ - 25 mm Stalen kozijn: 20 mm - kozijn ongevuld - flexpan 15x1 in kozijnstijl	Houten kozijn: VM 550 kg/m³ - 25 mm Stalen kozijn: 25 mm - kozijn gips gevuld
Aanslagrubber kozijn	Ja	Ja
Uitvoering	Stomp / Indek (geldt alleen voor de 54 mm uitvoering)	Stomp / Indek (geldt alleen voor de 54 mm uitvoering)
Kantafwerking	Onbehandeld, gelakt, geschilderd, kunststof ABS 2 mm (niet mogelijk bij de indek- en opdek uitvoering)	Onbehandeld, gelakt, geschilderd, kunststof ABS 2 mm (niet mogelijk bij de indek- en opdek uitvoering)
Deurnaald	N.v.t.	Aluminium brandwerende deurnaald met meranti afdeklat
Brandwerend	30 minuten; EW30 / EI1 30	30 minuten; EW30
Rookwerend	Optioneel Sa / S200	Optioneel Sa / S200
Geluidwerend	Optioneel 35 - 44dB	Optioneel 35 - 41dB
In- en uitbraakwerend	Optioneel RC2 / RC3	Optioneel RC2 / RC3
Klimaatklasse	Optioneel klimaat A / B / C	Optioneel klimaat A / B / C
MVO	Optioneel FSC	Optioneel FSC
GND	Optioneel GND label	Optioneel GND label
Glasopening	1092 mm x 2133 mm (oppervlakte < 2,11 m²) Stijlbreedte min. 140 mm / borstwering min. 200 mm	990 mm x 2220 mm Stijlbreedte min. 140 mm / borstwering min. 330 mm
Hang- en sluitwerk	Optioneel	Optioneel
Kozijntype	Hout / Staal	Hout / Staal

Pico60

Brandwerende utiliteitsdeur • HPL



Merbau stijlen (40 mm)
(stijlbreedte 36 mm)

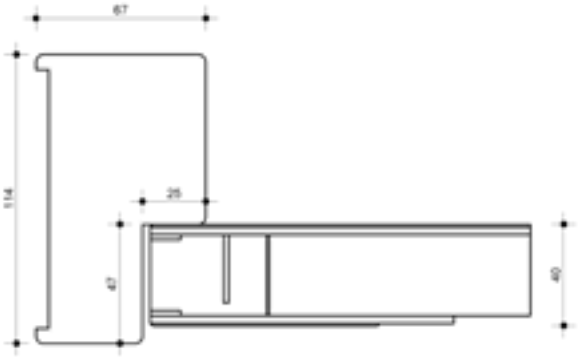
Brandwerende voorziening in regels, stijlen en aan de bovenkant

Merbau boven- en onderregel (40 mm)
(regelhoogte: 65 mm)

High Density Fibreboard (HDF)

High Pressure Laminate (HPL)
of edelfineer

Mineraalvezel vulling (dicht) /
volspaan vulling (glasopening)



Standaard:

Optioneel:

	Enkele deur	Dubbele deur
Deurbladdikte	HPL: 40 mm	HPL: 54 mm
Gewicht	Ca. 28 kg/m²	Ca. 28 kg/m²
Maximale hoogte	2674 mm	2315 mm
Maximale breedte	1231 mm	1227 mm
Maximale oppervlak	2,99 m²	N.v.t.
Maximale ruimte onder de deur	6 mm	6 mm
Bovenpaneel	Toegestaan, zie productblad bovenpaneel	Toegestaan, zie productblad bovenpaneel
Vuurzijde	Draaiend naar het vuur toe en van het vuur af	Draaiend naar het vuur toe en van het vuur af
Aanslagsponning kozijn	Houten kozijn: VM 550 kg/m³ - 25 mm Stalen kozijn: 20 mm - gipsgevuld	Houten kozijn: VM 550 kg/m³ - 25 mm Stalen kozijn: 20 mm - gipsgevuld
Aanslagrubber kozijn	Toegestaan, voorwaarde: brandvertragende uitvoering	Toegestaan, voorwaarde: brandvertragende uitvoering
Uitvoering	Stomp / Indek (geldt alleen voor de 54 mm uitvoering)	Stomp / Indek (geldt alleen voor de 54 mm uitvoering)
Kantafwerking	Onbehandeld, gelakt, geschilderd, kunststof ABS 2 mm	Onbehandeld, gelakt, geschilderd, kunststof ABS 2 mm (niet mogelijk bij de indek- en opdek uitvoering)
Deurnaald	N.v.t.	Aluminium brandwerende deurnaald met meranti afdeklat
Brandwerend	60 minuten; EW60	60 minuten; EW60
Rookwerend	Optioneel Sa / S200	Optioneel Sa / S200
Geluidwerend	Optioneel 35 - 41dB	Optioneel 35 - 41dB
In- en uitbraakwerend	Optioneel RC2 / RC3	Optioneel RC2 / RC3
Klimaatklasse	Optioneel klimaat A / B / C	Optioneel klimaat A / B / C
MVO	Optioneel FSC	Optioneel FSC
GND	Optioneel GND label	Optioneel GND label
Glasopening	951 mm x 2133 mm - Stijlbreedte min. 140 mm / borstwering min. 335 mm	830 mm x 1840 mm - Stijlbreedte min. 140 mm / borstwering min. 335 mm
Hang- en sluitwerk	Optioneel	Optioneel
Kozijntype	Hout / Staal	Hout / Staal

Bijlage 4

FSC Certificaten

bmtrada
Proud to be part of element

CERTIFICATE OF REGISTRATION

This is to certify that

Formica Limited
Coast Road
North Shields
Tyne & Wear
NE29 8RE

has been audited and found to meet the requirements of standard(s)
FSC-STD-40-003 (Version 2.1) EN, FSC-STD-40-004 (Version 3.0) EN and FSC-STD-50-001 (Version 1.2) EN for **FSC® Chain of Custody Certification**

Scope of certification
The purchase, processing, sales and distribution of laminates and wood based bonded items including outsourcing, under Transfer System (Multisite)

Products:
W8.2 Particleboard
W8.2.2 Veneered Particleboard
W8.3 Fibreboard
W12.11 Kitchen Countertops
P3.4.1 High Pressure Laminates (HPDL, HPL)
P3.4.3 Continuous Pressure Laminates (CPL)

Certificate number: TT-COC-003588

TT-CW-003588

Issue number: 2019-01

Certificate start date: 31 May 2016

Certificate expiry date: 30 May 2021

Date of initial certification: 31 May 2011

Karen Prendergast
Divisional Director - Certification
BM TRADA

Issuing Office: Warringtonfire Testing and Certification Limited t/a bmtrada Chiltern House, Stocking Lane, High Wycombe, Buckinghamshire, HP14 4ND, UK
Registered Office: 10 Lower Grosvenor Place, London, United Kingdom, SW1W 0EN Reg.No. 11371436

Appendix A

The network of participating sites shown below is included in the scope of certification shown on certificate number (**TT-COC-003588 & TT-CW-003588**)

Branch	Address
Formica Limited TT-COC-003588-B	Valmont Distribution Centre Formica SA Rue Du General De Gaulle Zone Industrielle 57730 Valmont France
Formica Limited TT-COC-003588-E	Aycliffe Industrial Park Newton Aycliffe Co Durham, DL5 6EF
Formica Limited TT-COC-003588-G	Barcelona Distribution Centre Formica ES El Pla 41 Poligono Industrial El Pla 08750 Molins De Rei Barcelono 8750, Spain
Formica Limited TT-COC-003588-D	Calle Riu Verd 8 46470, Albal Valencia Spain, 46470
Formica Limited TT-COC-003588-F	Kolho, Formica IKI Oy FI - 35990 Kolho Finland, 35990
Formica Limited TT-COC-003588-H	Madrid Distribution Centre Formica Es Fundiciones 32 Poligono Industrial Los Angeles 28906, Gatafe Madrid Spain
Formica Limited TT-COC-003588-Z	Perstorp Distribution Centre Perstrops Industripark Perstorp Village Sweden 284 80

CERTIFICATE

Information from 2019/05/20 - 7:10 UTC
Certificate Code SGSCH-COC-000543
Former Certificate Code SGS-COC-000543
License Code FSC-C013769
Controlled Wood Code SGSCH-CW-000543

MAIN ADDRESS

Name Holz Pichler S.p.A.
Address Via Ega Stenk 2
Nova Ponente
39050
BZ
ITALY
Website http://www.holz-pichler.com

CERTIFICATE DATA

Status Valid
First Issue Date 2000-10-17
Last Issue Date 2018-06-26
Expiry Date 2020-10-16
Standard FSC-STD-40-004 V3-0;FSC-STD-40-005 V3-1

GROUP MEMBER/SITES

No group member/sites found.

PRODUCTS

Product Type	Trade Name	Species	Primary Activity	Secondary Activity	Main Output Category

Product Type	Trade Name	Species	Primary Activity	Secondary Activity	Main Output Category
W1 Rough wood W1.2 Fuel wood		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	Primary Processor		FSC Controlled Wood;FSC 100%
W3 Wood in chips or particles W3.1 Wood chips		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	Primary Processor		FSC Controlled Wood;FSC 100%
W5 Solid wood (sawn, chipped, peeled) W5.2 Solid wood boards		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	Primary Processor		FSC Controlled Wood;FSC 100%
W5 Solid wood (sawn, chipped, peeled) W5.4 Planks		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	Primary Processor		FSC Controlled Wood;FSC 100%

Product Type	Trade Name	Species	Primary Activity	Secondary Activity	Main Output Category
W11 Wood for construction W11.2 Windows and window frames		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	Secondary Processor		FSC Controlled Wood;FSC Mix;FSC 100%
W6 Products from planing mill W6.1 Dimensional lumber, finished		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	Secondary Processor		FSC Controlled Wood;FSC 100%
W9 Engineered wood products W9.1 Finger jointed wood		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	Secondary Processor		FSC Controlled Wood;FSC Mix;FSC 100%
W6 Products from planing mill W6.2 Non-dimensional timber and lumber		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	Secondary Processor		FSC Controlled Wood;FSC 100%

Product Type	Trade Name	Species	Primary Activity	Secondary Activity	Main Output Category
W1 Rough wood W1.1 Roundwood (logs)		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders with physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W6 Products from planing mill W6.3 Boards, finished		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	Secondary Processor		FSC Controlled Wood;FSC 100%
W1 Rough wood W1.1 Roundwood (logs)		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders without physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W9 Engineered wood products W9.5 Solid-wood board		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	Secondary Processor		FSC Controlled Wood;FSC Mix;FSC 100%

Product Type	Trade Name	Species	Primary Activity	Secondary Activity	Main Output Category
W1 Rough wood W1.2 Fuel wood		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders without physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W11 Wood for construction W11.1 Doors and door frames		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	Secondary Processor		FSC Controlled Wood;FSC Mix;FSC 100%
W1 Rough wood W1.2 Fuel wood		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders with physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W9 Engineered wood products W9.6 Glued laminated timber (GLULAM)		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders without physical posession		FSC Controlled Wood;FSC Mix;FSC 100%

Product Type	Trade Name	Species	Primary Activity	Secondary Activity	Main Output Category
W3 Wood in chips or particles W3.1 Wood chips		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders with physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W3 Wood in chips or particles W3.1 Wood chips		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders without physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W6 Products from planing mill W6.1 Dimensional lumber, finished		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders with physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W5 Solid wood (sawn, chipped, peeled) W5.2 Solid wood boards		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders without physical posession		FSC Controlled Wood;FSC Mix;FSC 100%

Product Type	Trade Name	Species	Primary Activity	Secondary Activity	Main Output Category
W6 Products from planing mill W6.2 Non-dimensional timber and lumber		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders with physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W5 Solid wood (sawn, chipped, peeled) W5.2 Solid wood boards		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders with physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W6 Products from planing mill W6.2 Non-dimensional timber and lumber		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders without physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W5 Solid wood (sawn, chipped, peeled) W5.4 Planks		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders with physical posession		FSC Controlled Wood;FSC Mix;FSC 100%

Product Type	Trade Name	Species	Primary Activity	Secondary Activity	Main Output Category
W6 Products from planing mill W6.3 Boards, finished		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders without physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W5 Solid wood (sawn, chipped, peeled) W5.4 Planks		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders without physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W6 Products from planing mill W6.3 Boards, finished		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders with physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W6 Products from planing mill W6.1 Dimensional lumber, finished		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders without physical posession		FSC Controlled Wood;FSC Mix;FSC 100%

Product Type	Trade Name	Species	Primary Activity	Secondary Activity	Main Output Category
W9 Engineered wood products W9.1 Finger jointed wood		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders with physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W9 Engineered wood products W9.1 Finger jointed wood		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders without physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W9 Engineered wood products W9.5 Solid-wood board		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders without physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W9 Engineered wood products W9.5 Solid-wood board		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders with physical posession		FSC Controlled Wood;FSC Mix;FSC 100%

Product Type	Trade Name	Species	Primary Activity	Secondary Activity	Main Output Category
W9 Engineered wood products W9.6 Glued laminated timber (GLULAM)		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	brokers/traders with physical posession		FSC Controlled Wood;FSC Mix;FSC 100%
W1 Rough wood W1.1 Roundwood (logs)		Abies alba; Aucoumea klaineana Pierre; Betula pendula; Betula pubescens; Ceiba pentandra; Entandrophragma cylindricum; Entandrophragma utile; Fagus sylvatica L.; Larix decidua; Parashorea spp.; Picea abies; Pinus cembra; Pinus sylvestris; Populus spp.; Quercus alba; Quercus robur; Quercus rubra; Quercus spp; Tilia X europaea L.	Primary Processor		FSC Controlled Wood;FSC 100%

DOCUMENTS

File	Type
HOLZ PICHLER - ITCE.20140250.03 01 Risikoanalyse Österreich 2017 Rev.1 - approved.pdf	(Extended) Company Risk Assessment (available on Website)
HOLZ PICHLER - ITCE.20140250.03 02 Risikoanalyse Südtirol 2017 Rev.2 - approved.pdf	(Extended) Company Risk Assessment (available on Website)
HOLZ PICHLER - ITCE.20140250.03 GP4550B FSC COC CW Public Report rev. 1.pdf	Public Summary Report (available on website)
HOLZ PICHLER - ITCE.20140250.03 GP4555B FSC COC CW DDS Summary Template_HOLZ Rev.2 - approved.pdf	Public Summary Report (available on website)

CERTIFICATE

Information from 2019/05/20 - 7:47 UTC
Certificate Code SGSCH-COC-041240
Former Certificate Code WB-COC-001338
License Code FSC-C028828
Controlled Wood Code SGSCH-CW-041240

MAIN ADDRESS

Name Unilin bvba Division Panels
Address Ingelmunstersteeenweg, 229
OOSTROZEBEKE
8780
BELGIUM
Website http://www.unilin.com

CERTIFICATE DATA

Status Valid
First Issue Date 2009-11-02
Last Issue Date 2018-10-19
Expiry Date 2022-04-18
Standard FSC-STD-40-007 V2-0;FSC-STD-40-004 V2-1;FSC-STD-40-005 V3-1

GROUP MEMBER/SITES

No group member/sites found.

PRODUCTS

Product Type	Trade Name	Species	Primary Activity	Secondary Activity	Main Output Category
W8 Wood panels W8.2 Particleboard W8.2.1 Melamineparticleboard	MDF (including edge band)		Secondary Processor		FSC Mix
W8 Wood panels W8.3 Fibreboard W8.3.2 Medium-density fibreboard (MDF)	MDF, Lacquered, T&G		Secondary Processor		FSC Mix

Product Type	Trade Name	Species	Primary Activity	Secondary Activity	Main Output Category
W8 Wood panels W8.2 Particleboard	Particleboard (raw or lacquered) (profiled T&G)		Secondary Processor		FSC Mix
W8 Wood panels W8.3 Fibreboard W8.3.2 Medium-density fibreboard (MDF)	Fiberboard MDF		brokers/traders with physical posession		FSC Mix
P3 Paperboard P3.4 Paperboardlaminates P3.4.1 High-pressure laminates	HPL		Secondary Processor		FSC Controlled Wood;FSC Mix
P2 Paper P2.4 Specialty paper P2.4.1 Impregnated papers	EDT		brokers/traders with physical posession		FSC Controlled Wood
P2 Paper P2.4 Specialty paper P2.4.1 Impregnated papers	Paper - BRL		brokers/traders with physical posession		FSC Controlled Wood
W9 Engineered wood products W9.7 I-joists, I-beams	I-joists		brokers/traders with physical posession		FSC Mix;FSC 100%
W9 Engineered wood products W9.2 Laminated veneer lumber (LVL)	LVL		brokers/traders with physical posession		FSC Mix;FSC 100%
W8 Wood panels W8.3 Fibreboard W8.3.2 Medium-density fibreboard (MDF)		Picea abies; Pseudotsuga menziesii	Primary Processor		FSC Controlled Wood;FSC Mix

DOCUMENTS

File	Type
Unilin - DDS ChipMel_Summary _ final_04.10.2017.pdf	(Extended) Company Risk Assessment (available on Website)

File	Type
Unilin bvba ESG2017 GP4550B FSC COC CW Public Report.pdf	Public Summary Report (available on website)
Unilin RA Luxembourg 2017.pdf	(Extended) Company Risk Assessment (available on Website)
Unilin RA Netherlands 2017.pdf	(Extended) Company Risk Assessment (available on Website)
Unilin Simplified RA France - North.pdf	(Extended) Company Risk Assessment (available on Website)

CERTIFICATE

CERTIFICATION CODE: CU-COC-802320

Field of attention:
FSC Chain of Custody (COC)

Issued to:
WWP Woodproducts BV
Groenlo, NETHERLANDS
Project in:NETHERLANDS

Standard:

FSC-STD-50-001 (V1-2) Requirements for use of the FSC trademarks by Certificate Holders
FSC-STD-40-004 V2-1 FSC Standard for Chain of Custody Certification

Valid until: 15 April 2020

The validity of this certificate shall be verified on http://info.fsc.org/

Control Union Certifications declares to have inspected the unit(s), and/or products of the above mentioned certificate holder, and have found them in accordance with the standards mentioned above.

This certificate covers the unit(s), and/or product(s) as mentioned in the authenticated annex of this certificate. A full list of product groups covered by the certificate can be found on the FSC database of registered certificates (http://info.fsc.org/).

This certificate itself does not constitute evidence that a particular product supplied by the certificate holder is FSC-certified [or FSC Controlled Wood]. Products offered, shipped or sold by the certificate holder can only be considered covered by the scope of this certificate when the required FSC claim is clearly stated on invoices and shipping documents.
This certificate is in force until further notice, provided that the above-mentioned client continues meeting the conditions as laid down in the client contract with Control Union Certifications. Based on the annual inspections that Control Union Certifications performs, this certificate is updated and kept into force.

Date of certification:
16 April 2015
Place and date of issue:
Zwolle, 01 April 2015

CERTIFICATE No: C802320CU-COC-01.2015
REGISTRATION No: CU 802320

FSC
www.fsc.org
FSC® A000507

The mark of responsible forestry

Declared by:

On behalf of the Managing Director

Mr. R. van de Rozenberg

Certifier
Control Union Certifications
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CERTIFICATE

FSC
www.fsc.org
FSC® A000515

The mark of responsible forestry

Certificate Number
IMO-COC-023069
IMO-CW-023069

for

Homanit GmbH & Co KG
Niederlosheimer Str. 109
DE - 66679 Losheim Am See

Based on its audit and on a signed contract, the IMOswiss AG (IMO) herewith certifies that the above mentioned operations's product flow (Chain of Custody) is in line with the following standards of the Forest Stewardship Council:

FSC-STD-40-004-3-0
FSC-STD-40-005-3-1
FSC-STD-50-001-1-2

The company is committed to only pass on those FSC-labelled products, which are consistently traceable. This certificate remains the property of IMO. It becomes invalid and shall be returned immediately on request if the requirements are not met.

The operation is hereby authorised to sell the following products as FSC certified:
Softboard, MDF-fibreboard, HDF-fibreboard

This certificate itself does not constitute evidence that a particular product is FSC-certified or FSC Controlled Wood. The products are only certified when the required FSC claim is clearly stated on invoices and shipping documents.

Valid until: **11.06.2023**
Validity and list of product groups to be verified on: http://info.fsc.org
Date of first certification: **12.06.2003**
Weinfelden, **20.06.2018**

IMOswiss AG
Thomas Papp-Váry, certification manager

Bijlage 5

VOC Verklaringen

5.1: Batiboard

Zie paragraaf 3.4.2. en 4 voor het uiteindelijke resultaat.

5.2: Sauerland

DIBt richlinie100 verklaring, en AgBB evaluation scheme 2018.

5.3: Unilin

Declaration of performance, met benoemd de emissie klasse volgens EN-13986

5.4: Homanit

DIBt richlinie100 verklaring, en AgBB evaluation scheme 2018.

5.5: Formica

Greenguard label certificaat

5.6: Rakoll ECO3

Rapport met max. formaldehyde waarde

5.7: AgBB

AgBB evaluation scheme 2018, paragraaf AgBB tasks for ensuring a healthy indoor air quality in built structures.
Geeft uitleg hoe AgBB en DIBt samenwerken.

5.1 Batiboard

FCBA

INSTITUT TECHNOLOGIQUE

Rapport de classement sur les émissions en substances volatiles polluantes des produits de construction selon les arrêtés du 19 avril 2011, du 30 avril 2009 et du 28 mai 2009

Classification report concerning emissions in volatile pollutant emissions from building products in accordance with orders from April 19th, 2011, April 30th, 2009 and May 28th, 2009

Demandeur : *Customer*	**THERMAL CERAMICS DE FRANCE S.A.S.U.** Route de Lauterbourg F-67160 WISSEMBOURG
Elaboré par : *Written by*	**FCBA** Laboratoire de chimie écotoxicologie Allée de Boutaut BP 227 F-33028 BORDEAUX Cedex
Textes et normes de référence en appui du classement : *Classification references*	Arrêtés du 30 avril 2009 et du 28 mai 2009 relatifs aux conditions de mise sur le marché des produits de construction et de décoration contenant des substances CMR de catégorie 1 ou 2 *Orders from April 30th, 2009 and May 28th, 2009 for construction and decoration products containing substances CMR of category 1 or 2* 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 *Order for the labelling of construction and decoration products with their volatile pollutant emissions (April 19th, 2011)* NF EN ISO 16000-11, NF EN ISO 16000-9, NF ISO 16000-6, NF ISO 16000-3
Type de produit : *Type of product*	Panneaux d'isolation à base de perlite expansée, fibres de différentes natures et liants *Insulation boards composed of expanded perlite, various types of fibres and binders*
Références commerciales : *Commercial references*	**Batiboard 200**
Numéro du rapport de classement : *Reference of the classification report*	**402-RC-13-04-f-e**
Date d'émission / *Emission date* :	18 juin 2013 / *June 18, 2013* Annule et remplace / *cancels and replaces* N°402-RC-13-04-f-e du / *from* 15/05/2013
Nom / *Name* : **Christophe YRIEIX**	Fonction : **Responsable Technique Qualité de l'Air** *Function : Air Quality Technical Manager*
Signature / *Sign* :	

Ce rapport de classement comprend 6 pages. Il ne peut être utilisé ou reproduit que dans son intégralité. En cas de différences entre les versions française et anglaise, seule la version française fait foi.
L'utilisation des résultats mentionnés ci-dessus est sous l'entière responsabilité du fabricant. Elle est basée sur les déclarations du fabricant concernant l'appartenance de l'échantillon testé à la famille commerciale et sur son engagement à avoir fourni un échantillon représentatif de sa production.
The classification report consists of 6 pages and may only be used or reproduced in totality. In the event of any inaccuracies or differences between the French and the English versions, the French version of this report will prevail.
The use of the results mentioned above is under the entire responsibility of the manufacturer. It is based on the declarations of the manufacturer concerning the membership of the sample tested with the commercial family and on its engagement to have provided a sample representative of its production.

Institut technologique FCBA : Forêt, Cellulose, Bois – construction, Ameublement

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1 Introduction / *Introduction*

Le présent rapport définit le classement attribué à une gamme de produits d'isolation commercialisée par la société THERMAL CERAMICS DE FRANCE pour leurs émissions en substances volatiles polluantes mesurées conformément aux modes opératoires définis dans la série de normes ISO 16000 (parties 3, 6, 9 et 11).

This report defines the classification assigned to a product range of thermal insulation boards manufactured by THERMAL CERAMICS DE FRANCE concerning their emissions in volatile pollutant emissions in accordance with ISO 16000 Standard series (part 3, 6, 9, 11).

Il s'applique uniquement aux références commerciales de THERMAL CERAMICS DE FRANCE pour des produits d'isolation présentant la même composition que le produit testé (panneau isolant mono couche constitué de perlite expansée, fibres de différentes natures et liants).

It applies exclusively to commercial references of THERMAL CERAMICS DE FRANCE for thermal insulation products presenting the same composition as the tested product (mono-layered thermal insulation board composed of expanded perlite, various types of fibres and binders).

2 Représentativité du produit testé / *Representativity of tested product*

Le produit retenu est un échantillon de panneau isolant mono couche à base de perlite expansée, fibres de différentes natures et liants. Il a été testé pour représenter les cas le plus défavorable.

Retained product is mono-layered thermal insulation board composed of expanded perlite, various types of fibres and binders. It has been retained to represent worst case.

2.1 Essai sur Batiboard 200 / *Test on Batiboard 200*

Cet essai a pour objectif d'étudier l'influence du panneau, le produit testé présentant l'épaisseur maximale (50 mm).

This test is carried out in order to evaluate the influence of panel, tested. The tested product with the maximal thickness (50 mm) has been retained :

Nom / *Name* :	Batiboard 200
Composition / *Composition*	Panneau isolant mono-couche d'épaisseur 50 mm constitué de perlite expansée, fibres et liants (densité : 260 kg/m^3) poncé mécaniquement sur la face top et enduite sur les 2 faces par un traitement anti-poussière (peinture acrylique en phase aqueuse). *Mono-layered 50 mm thick insulation board made of expanded perlite, fibres and binders (density : 260 kg/m^3) mechanically sanded on the top face and coated on the both faces by a dust-free treatment (water based acrylic painting)*
Epaisseur / *Thickness*	50 mm

2.2 Extension à d'autres produits / *Extension to other products*

Pour viser le même classement, les autres produits de la gamme devront présenter les performances suivantes :

To aim to the same classification, others products shall present following performances :

- panneau de même composition que le produit Batiboard 200, mais avec une épaisseur ne dépassant pas 50 mm
  board with the same nature as Batiboard 200, but with a thickness not exceeding 50 mm
- panneau avec un traitement anti-poussières jusqu'à 2 faces
  board up to 2 faces dust treatment

2.3 Références commerciales / *Commercial references*

Le produit technique décrit au chapitre 2.1 (Batiboard 200) se décline sous les références commerciales suivantes :

Tested product described in chapter 2.1 is thermal insulation board based on expanded perlite (Batiboard 200). The commercial references of the tested product are following :

Référence technique *Technical reference*	Références commerciales * *Commercial references **	Epaisseur * *Thickness **
Batiboard 200	Batiboard 200 non poncé et sans traitement des faces / *Batiboard 200 unsanded and no treatment* Batiboard 200 poncé 1 face et traitement des 2 faces / *Batiboard 200 top sanded and two faced treatment* Batiboard 200 poncé 2 faces et traitement des 2 faces / *Batiboard 200 two faced sanded and two faced treatment*	25 / 30 / 35 / 40 / 45 / 50 mm

(*) informations fournies par THERMAL CERAMICS DE FRANCE et non vérifiées par le laboratoire de chimie-écotoxicologie de FCBA
informations supplied by THERMAL CERAMICS DE FRANCE and not verified by FCBA chemistry-ecotox laboratory

3 Rapports d'essai en appui du classement / *Test reports in support of classification*

3.1 Textes de références / *References*

Arrêtés du 30 avril 2009 et du 28 mai 2009 relatifs aux conditions de mise sur le marché des produits de construction et de décoration contenant des substances CMR de catégorie 1 ou 2.
Orders from April 30th, 2009 and May 28th, 2009 for construction and decoration products containing substances CMR of category 1 or 2.

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.
Order for the labelling of construction and decoration products with their volatile pollutant emissions (April 19th, 2011)

3.2 Rapports d'essai en appui du classement / *Test reports in support of classification*

Nom du laboratoire *Laboratory name*	Nom du demandeur *Customer name*	Référence du rapport d'essais *Test report reference*	Norme d'essai appliquée *Applied Standard*
Laboratoire de chimie-écotoxicologie de FCBA	THERMAL CERAMICS DE FRANCE	402/12/1000C/7-f-e du 13/05/2013	NF EN ISO 16000-11 NF EN ISO 16000-9 NF ISO 16000-3 NF ISO 16000-6

3.3 Résultats d'essai / *Test results*

Le niveau d'émission est indiqué par la concentration d'exposition (C_{exp}) établie sur la base des mesures réalisées après 28 jours en chambre d'essai d'émission. Il est calculé à partir de différents scénarii d'exposition (« Sol ou plafond », « Murs », « Porte ») et exprimé en $\mu g.m^{-3}$.

Level emission is indicated by exposure concentration (C_{exp}) taken after 28 days in emission test chamber. It was calculated with several exposure scenarios ("Floor or ceiling", "Walls", "Door") and expressed in $\mu g.m^{-3}$.

Scénario d'exposition *Exposure scenario*	Sol ou plafond *Floor or ceiling*	Murs *Walls*	Porte *Door*
Substance volatile *Volatile substance*	C_{exp} ($\mu g.m^{-3}$)	C_{exp} ($\mu g.m^{-3}$)	C_{exp} ($\mu g.m^{-3}$)
Benzène (numéro CAS : 71-43-2) *Benzene (CAS number : 71-43-2)*	nd < 0,3	nd < 0,8	nd < 0,1
Trichloroéthylène (numéro CAS : 79-01-6) *Trichloroethylene (CAS number : 79-01-6)*	nd < 0,1	nd < 0,2	nd < 0,1
Phtalate de dibutyle (numéro CAS : 84-74-2) *Dibutyl phtalate (CAS number : 84-74-2)*	nd < 0,2	nd < 0,6	nd < 0,1
Phtalate de bis(2-éthylhexyle) (numéro CAS : 117-81-7) *Bis(2-ethylhexyl) phtalate (numer CAS : 117-81-7)*	nd < 0,2	nd < 0,6	nd < 0,1
Formaldéhyde (numéro CAS : 50-00-0) *Formaldehyde (CAS number : 50-00-0)*	nq < 0,8	nq < 2,0	nq < 0,1
Acétaldéhyde (numéro CAS : 75-07-0) *Acetaldehyde (CAS number : 75-07-0)*	nq < 3,0	nq < 7,6	nq < 0,4
Toluène (numéro CAS : 108-88-3) *Toluene (CAS number : 108-88-3)*	nd < 2,0	nd < 5,0	nd < 0,3
Tétrachloroéthylène (numéro CAS : 127-18-4) *Tetrachloroethylene (numer CAS : 127-18-4)*	nd < 11	nd < 27,6	nd < 1,4
Xylène (numéro CAS : 1330-20-7) *Xylene (CAS number : 1330-20-7)*	nd < 1,9	nd < 4,8	nd < 0,2
1,2,4-Triméthylbenzène (numéro CAS : 95-63-6) *1,2,4-Trimethylbenzene (CAS number : 95-63-6)*	nd < 9,0	nd < 22,6	nd < 1,1
1,4-Dichlorobenzène (numéro CAS : 106-46-7) *1,4-Dichlorobenzene (CAS number : 106-46-7)*	nd < 9,0	nd < 22,6	nd < 1,1
Éthylbenzène (numéro CAS : 100-41-4) *Ethylbenzene (CAS number : 100-41-4)*	nd < 9,0	nd < 22,6	nd < 1,1
2-Butoxyéthanol (numéro CAS : 111-76-2) *2-Butoxyethanol (CAS number : 111-76-2)*	nd < 9,0	nd < 22,6	nd < 1,1
Styrène (numéro CAS : 100-42-5) *Styrene (CAS number : 100-42-5)*	nd < 1,9	nd < 4,8	nd < 0,2
Composés organiques volatils totaux (COVT) *Total volatile organic Compounds (TVOC)*	9,0	22,6	1,1

nd : non détecté / *not detected*

nq : détecté mais non quantifié / *detected but not quantified*

3.4 Classement des produits testés / *Classification of tested products*

3.4.1 Arrêtés du 30 avril 2009 et du 28 mai 2009 / *Orders from April 30th, 2009 and from May 28th, 2009*

Les concentrations d'exposition établies sur la base des mesures réalisées après 28 jours en chambre d'essai d'émission ont été comparées aux valeurs de référence définies dans les arrêtés du 30 avril 2009 et du 28 mai 2009 selon le scénario d'exposition retenu par le client (« Sol ou plafond », « Murs », « Porte »). Il convient de vérifier que l'émission en substances CMR de catégorie 1 et 2 soit inférieure à 1 $\mu g.m^{-3}$.

Exposure concentrations taken after 28 days in emission test chamber have been compared to reference values defined in Orders from April 30th, 2009 and from May 28th, 2009 with exposure scenario retained by the customer ("Floor or ceiling", "Walls", "Door"). Emission in CMR substances category 1 and 2 must be inferior to 1 $\mu g.m^{-3}$.

Le tableau suivant reprend la conformité du produit décrit au chapitre 2.1 (Batiboard 200) avec les arrêtés du 30 avril 2009 et du 28 mai 2009.

Conformity of product described in chapter 2.1 (Batiboard 200) to Orders from April 30th, 2009 and from May 28th, 2009 is presented in following table.

Scénario d'exposition *Exposure scenario*	Murs *Walls*	Sol ou plafond *Floor or ceiling*	Porte *Door*
Substance volatile ***Volatile substance***	**Conforme** ***Conform***	**Conforme** ***Conform***	**Conforme** ***Conform***
Benzène (numéro CAS : 71-43-2) *Benzene (CAS number : 71-43-2)*	Oui *Yes*	Oui *Yes*	Oui *Yes*
Trichloroéthylène (numéro CAS : 79-01-6) *Trichloroethylene (CAS number : 79-01-6)*	Oui *Yes*	Oui *Yes*	Oui *Yes*
Phtalate de dibutyle (numéro CAS : 84-74-2) *Dibutyl phtalate (CAS number : 84-74-2)*	Oui *Yes*	Oui *Yes*	Oui *Yes*
Phtalate de bis(2-éthylhexyle) (numéro CAS : 117-81-7) *Bis(2-ethylhexyl) phtalate (numer CAS : 117-81-7)*	Oui *Yes*	Oui *Yes*	Oui *Yes*

3.4.2 Arrêté du 19 avril 2011 / *Order from April 19th, 2013*

Les caractéristiques d'émissions de substances volatiles à rechercher selon l'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 sont formalisées selon une échelle de quatre classes de A+ à C, la classe A+ indiquant un niveau d'émission très peu élevé, la classe C, un niveau d'émission élevé.

The characteristics of substance emissions according to French Order for the labelling of construction and decoration products with their volatile pollutant emissions (April 19th, 2011) are rated from A+ to C, A+ indicating a very low level emission and C a high level of emissions.

Les concentrations d'exposition établies sur la base des mesures réalisées après 28 jours en chambre d'essai d'émission ont été comparées aux classes d'émission définies dans l'arrêté du 19 avril 2011 selon le scénario d'exposition retenu par le client (« Sol ou plafond », « Murs », « Porte »).

Exposure concentrations taken after 28 days in emission test chamber have been compared to reference values defined in Order from April 19th, 2011 with exposure scenario retained by the customer ("Floor or ceiling", "Walls", "Door").

Classe / *Class*	C	B	A	A+
Formaldéhyde (numéro CAS : 50-00-0) *Formaldehyde (CAS number : 50-00-0)*	> 120	< 120	< 60	< 10
Acétaldéhyde (numéro CAS : 75-07-0) *Acetaldehyde (CAS number : 75-07-0)*	> 400	< 400	< 300	< 200
Toluène (numéro CAS : 108-88-3) *Toluene (CAS number : 108-88-3)*	> 600	< 600	< 450	< 300
Tétrachloroéthylène (numéro CAS : 127-18-4) *Tetrachloroethylene (numer CAS : 127-18-4)*	> 500	< 500	< 350	< 250
Xylène (numéro CAS : 1330-20-7) *Xylene (CAS number : 1330-20-7)*	> 400	< 400	< 300	< 200
1,2,4-Triméthylbenzène (numéro CAS : 95-63-6) *1,2,4-Trimethylbenzene (CAS number : 95-63-6)*	> 2000	< 2000	< 1500	< 1000
1,4-Dichlorobenzène (numéro CAS : 106-46-7) *1,4-Dichlorobenzene (CAS number : 106-46-7)*	> 120	< 120	< 90	< 60
Éthylbenzène (numéro CAS : 100-41-4) *Ethylbenzene (CAS number : 100-41-4)*	> 1500	< 1500	< 1000	< 750
2-Butoxyéthanol (numéro CAS : 111-76-2) *2-Butoxyethanol (CAS number : 111-76-2)*	> 2000	< 2000	< 1500	< 1000
Styrène (numéro CAS : 100-42-5) *Styrene (CAS number : 100-42-5)*	> 500	< 500	< 350	< 250
Composés organiques volatils totaux (COVT) *Total volatile organic Compounds (TVOC)*	> 2000	< 2000	< 1500	< 1000

Le tableau suivant reprend la classe d'émission obtenue à partir des concentrations d'exposition du produit décrit au chapitre 2.1 (Batiboard 200).

Obtained emission class from product described in chapter 2.1 (Batiboard 200) is indicated in following table.

Scénario d'exposition *Exposure scenario*	Sol ou plafond *Floor or ceiling*	Murs *Walls*	Porte *Door*
Substance volatile ***Volatile substance***	**Classe d'émission** ***Emission class***	**Classe d'émission** ***Emission class***	**Classe d'émission** ***Emission class***
Formaldéhyde (numéro CAS : 50-00-0) *Formaldehyde (CAS number : 50-00-0)*	A+	A+	A+
Acétaldéhyde (numéro CAS : 75-07-0) *Acetaldehyde (CAS number : 75-07-0)*	A+	A+	A+
Toluène (numéro CAS : 108-88-3) *Toluene (CAS number : 108-88-3)*	A+	A+	A+
Tétrachloroéthylène (numéro CAS : 127-18-4) *Tetrachloroethylene (numer CAS : 127-18-4)*	A+	A+	A+
Xylène (numéro CAS : 1330-20-7) *Xylene (CAS number : 1330-20-7)*	A+	A+	A+
1,2,4-Triméthylbenzène (numéro CAS : 95-63-6) *1,2,4-Trimethylbenzene (CAS number : 95-63-6)*	A+	A+	A+
1,4-Dichlorobenzène (numéro CAS : 106-46-7) *1,4-Dichlorobenzene (CAS number : 106-46-7)*	A+	A+	A+
Éthylbenzène (numéro CAS : 100-41-4) *Ethylbenzene (CAS number : 100-41-4)*	A+	A+	A+
2-Butoxyéthanol (numéro CAS : 111-76-2) *2-Butoxyethanol (CAS number : 111-76-2)*	A+	A+	A+
Styrène (numéro CAS : 100-42-5) *Styrene (CAS number : 100-42-5)*	A+	A+	A+
Composés organiques volatils totaux (COVT) *Total volatile organic Compounds (TVOC)*	A+	A+	A+
Classe d'émission résultante ***Resulting emission class***			

4 Classement de la gamme de produits et domaine d'application / *Classification of product range and field of application*

4.1 Textes de références / *References*

Arrêtés du 30 avril 2009 et du 28 mai 2009 relatifs aux conditions de mise sur le marché des produits de construction et de décoration contenant des substances CMR de catégorie 1 ou 2.

Orders from April 30th, 2009 and May 28th, 2009 for construction and decoration products containing substances CMR of category 1 or 2.

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.

Order for the labelling of construction and decoration products with their volatile pollutant emissions (April 19th, 2011).

4.2 Extrapolation aux autres produits de la gamme / *Extrapolation to other products*

4.2.1 Domaine d'application et limitations / *Field of application and limitations*

Le présent rapport de classement s'applique uniquement aux références commerciales de THERMAL CERAMICS DE FRANCE pour des produits d'isolation présentant la même composition que le produit testé (panneau isolant mono couche constitué de perlite expansée, fibres de différentes natures et liants).

This classification report is applied exclusively to commercial references of THERMAL CERAMICS DE FRANCE for thermal insulation products presenting the same composition as the tested product (mono-layered thermal insulation board composed of expanded perlite, various types of fibres and binders).

Le classement défini dans le présent rapport est valable pour les caractéristiques suivantes liées aux produits :

The classification defined in this present report is valid for the following characteristics in relation with the product :

- le panneau de perlite expansé est identique à celui du produit testé (Batiboard 200) en terme de composition et de masse volumique

  board based on expanded perlite presents the same composition and the same density than the tested product (Batiboard 200)

- le panneau de perlite expansée ne dépasse pas une épaisseur de 50 mm

  board based on expanded perlite does not exceed a thickness of 50 mm

Le suivi de la conformité des références commerciales citées au chapitre 2.3 avec les caractéristiques de performance citées au chapitre 2.2 du présent rapport doit être démontré : composition strictement identique ou minimaliste tel que défini au chapitre 2.1 par rapport au produit testé.

Conformity follow-up of commercial ranges quoted in chapter 2.3 and their conformity with stated performance characteristics specified in chapter 2.2 of this report of classification shall be demonstrated : strictly identical or minimalist composition as defined in chapter 2.1 with regard to tested product.

Le rattachement des références commerciales au descriptif technique, tel que présenté au chapitre 2.3, reste sous l'entière responsabilité du demandeur (THERMAL CERAMICS DE FRANCE). Elle est basée sur les déclarations du demandeur concernant l'appartenance de la référence commerciale à ce descriptif technique et sur son engagement à avoir fourni un échantillon représentatif de sa production.

The reliability between commercial references and technical description, as described in paragraph 2.3, is under the entire responsibility of the manufacturer (THERMAL CERAMICS DE FRANCE). It is based on the declarations of the manufacturer concerning the membership of the sample tested with the commercial family and on its engagement to have provided a sample representative of its production.

Enfin, le présent rapport de classement ne s'apparente pas à un suivi de la production en usine par le fabricant.

Finally, the present report of classification does not correspond to a factory production control.

4.2.2 Conformité selon les arrêtés du 30 avril 2009 et du 28 mai 2009 / *Conformity with Orders from April 30th, 2009 and May 28th, 2009*

Références commerciales * *Commercial references* *	Epaisseur * *Thickness* *	Conformité selon les arrêtés du 30 avril 2009 et du 28 mai 2009 *Conformity with Orders from April 30th, 2009 and May 28th, 2009*		
		Scénario d'exposition *Exposure scenario*		
		Murs *Walls*	Sol ou plafond *Floor or ceiling*	Porte *Door*
Batiboard 200 non poncé et sans traitement des faces / *Batiboard 200 unsanded and no treatment*	25 / 30 / 35 / 40 / 45 / 50 mm	Conforme / *Conform*	Conforme / *Conform*	Conforme / *Conform*
Batiboard 200 poncé 1 face et traitement des 2 faces / *Batiboard 200 top sanded and two faced treatment*		Conforme / *Conform*	Conforme / *Conform*	Conforme / *Conform*
Batiboard 200 poncé 2 faces et traitement des 2 faces / *Batiboard 200 two faced sanded and two faced treatment*		Conforme / *Conform*	Conforme / *Conform*	Conforme / *Conform*

(*) informations fournies par THERMAL CERAMICS DE FRANCE et non vérifiées par le laboratoire de chimie-écotoxicologie de FCBA
informations supplied by THERMAL CERAMICS DE FRANCE and not verified by FCBA chemistry-ecotox laboratory

4.2.3 Classement selon l'arrêté du 19 avril 2011 / *Classification according to Order from April 19th, 2011*

Références commerciales * *Commercial references* *	Epaisseur * *Thickness* *	Classement selon l'arrêté du 19 avril 2011 *Classification according to Order from April 19th, 2011*		
		Scénario d'exposition *Exposure scenario*		
		Murs *Walls*	Sol ou plafond *Floor or ceiling*	Porte *Door*
Batiboard 200 non poncé et sans traitement des faces / *Batiboard 200 unsanded and no treatment*	25 / 30 / 35 / 40 / 45 / 50 mm			
Batiboard 200 poncé 1 face et traitement des 2 faces / *Batiboard 200 top sanded and two faced treatment*				
Batiboard 200 poncé 2 faces et traitement des 2 faces / *Batiboard 200 two faced sanded and two faced treatment*				

(*) informations fournies par THERMAL CERAMICS DE FRANCE et non vérifiées par le laboratoire de chimie-écotoxicologie de FCBA
informations supplied by THERMAL CERAMICS DE FRANCE and not verified by FCBA chemistry-ecotox laboratory

E1-Klassifizierung

Sauerland Spanplatte

Rechtslage

Chemikalien Verbotsverordnung (Oktober 1993) Anhang zu § 1, Abschnitt 3, Spalte 2: Beschichtete und unbeschichtete Holzwerkstoffe (Spanplatten, ...) dürfen nicht in den Verkehr gebracht werden, wenn die durch den Holzwerkstoff verursachte Ausgleichskonzentration des Formaldehyds in der Luft eines Prüfraums 0,1 ml/m³ (ppm) überschreitet. Die Ausgleichskonzentration ist nach einem Prüfverfahren zu messen, das dem Stand von Wissenschaft und Technik entspricht. Das Bundesgesundheitsamt veröffentlicht im Einvernehmen mit der Bundesanstalt für Materialforschung nach Anhörung von Sachverständigen Prüfverfahren, die diesen Anforderungen entsprechen.

Klassifizierungs-Prüfung

Holzwerkstoffplatten sind bezüglich ihrer Formaldehydabgabe für jede Plattenart und jedes Herstellwerk durch ein zugelassenes Institut zu klassifizieren.

Die SAUERLAND SPANPLATTE wurde durch das 'Fraunhofer-Institut für Holzforschung Wilhelm-Klauditz-Institut - WKI' bzw. durch die 'Entwicklungs- und Prüflabor Holztechnologie GmbH Dresden (eph)' in die Emissionsklasse E 1 nach der DIBt-Richtlinie 100 eingestuft.

Eigenüberwachung

Die Eigenüberwachung erfolgt ständig nach DIN EN 120 'Perforatormethode' in unseren Werkslabors.

Fremdüberwachung

Das 'WKI' bzw. die 'eph' überwacht die Einhaltung der zulässigen Formaldehyd-Emissionswerte entsprechend der DIBt-Richtlinie sowohl an Stichproben als auch durch Nachprüfung der werkseigenen Produktionskontrolle.

E1 - Zertifikat

Bei Bedarf senden wir Ihnen gern die kompletten und aktuellen Unterlagen zu.

WKI-Vertrag vom 06.02.1986
und Prüfbericht

Bestätigung SAUERLAND SPANPLATTE

Hiermit bestätigen wir, dass wir ausschließlich Spanplatten der Emissionsklasse E 1 entsprechend der DIBt-Richtlinie 100 herstellen.

Unilin bvba, division panels
Ingelmunstersteenweg 229, 8780 Oostrozebeke, Belgium
T: +32 56 66 70 21 - **F** : +32 56 66 82 25
info.panels@unilin.com - www.unilin.com

PRESTATIEVERKLARING	
Referentie :	DOPAir400v2
Commerciële naam :	Air400
Producttype :	Lichte Spaanplaat
Normverwijzing :	Houtachtige plaatmaterialen - EN 13986 Annex A Tabel A.4
CE klasse :	LP1
Toepassingsgebied :	Niet structurele toepassing in droge omstandigheden
AVCP Klasse :	4
Certificaatnummer :	Niet van toepassing
Geproduceerd te:	Breestraat 4,B-8710 Wielsbeke
	Ingelmunstersteenweg 299,B-8780 Oostrozebeke
	Ridder de Ghellinckstraat 9,B-8710 Wielsbeke

Essentiële eigenschappen	Eenheid	Referentie	Dikteklasse (mm)		
			> 25-32	> 32-40	> 40
Densiteit (richtwaarde)	kg/m³	-	470	470	470
Buigsterkte	N/mm²	EN 16368-tabel 3	2,5	2,0	2,0
Elasticiteitsmodulus	N/mm²	EN 16368-tabel 3	450	400	375
Treksterkte	N/mm²	EN 16368-tabel 3	0,17	0,14	0,14
Formaldehydeklasse	Klasse	EN 13986-tabel B1	E1	E1	E1
Formaldehydegehalte	mg/100g	EN 120	≤ 8	≤ 8	≤ 8
Brandreactie	Klasse	EN 13501-1	E	E	E
Dampdoorlaatbaarheid μ	nat	EN 13986-tabel 9	12	12	12
	droog		50	50	50
Isolatie tegen luchtgeluiden R	dB	EN 13986-5.10	NPD	NPD	NPD
Geluidsabsorptie α		EN 13986-tabel 10	0,10/0,25	0,10/0,25	0,10/0,25
Thermische geleidbaarheid λ	W/m.K	EN 13986-tabel 11	0,09	0,09	0,09
Biologische duurzaamheid	Gebruiks-klasse	EN 335	1	1	1
PCP inhoud	ppm	EN 13986-5.18	< 5	< 5	< 5

Versiedatum :
21/04/2015

Lode De Boe,
President UNILIN bvba, division panels

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Homanit GmbH & Co. KG
À l'att. de Madame Jolanta Klein
Bahnhofstraße 30

D-37412 Herzberg am Harz

j.klein@homanit.de

Dresde, le 05.11.2012
50 br/ku

Résumé des résultats d'expertise selon l'ARRÊTÉ 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

Sur la base des expertises ci-après:

Rapport d'expertise 252345/1
du 05.11.2012

panneau de fibres de densité élevée Homadur revêtement unilatéral, 3,0 mm, vernis UV

Les épreuves ont été réalisées selon ISO 16000, parties 3, 6 et 9. La charge en chambre d'épreuve était de 1 m²/m³.

Tableau 1: Exigences d'après l'ordonnance française "Arrêté étiquetage" en µg/m³

	C	B	A	A+
Formaldehydes	> 120	< 120	< 60	< 10
Acetaldehydes	> 400	< 400	< 300	< 200
Toluènes	> 600	< 600	< 450	< 300
Tetrachloréthylènes	> 500	< 500	< 350	< 250
Xylènes	> 400	< 400	< 300	< 200
1,2,4-Trimethylbenzènes	> 2000	< 2000	< 1500	< 1000
1,4-Dichlorbenzènes	> 120	< 120	< 90	< 60
Ethylbenzènes	> 1500	< 1500	< 1000	< 750
2-Butoxyéthanol	> 2000	< 2000	< 1500	< 1000
Styrènes	> 500	< 500	< 350	< 250
TVOC	**> 2000**	**< 2000**	**< 1500**	**< 1000**

Fraunhofer
WKI

Bescheinigung
E1-631-1/2016

Hiermit wird bescheinigt, dass im ersten Halbjahr 2016 eine Regelüberwachung für das Produkt

MDF/HDF

MDF, UF/MUF, beschichtet
Technische Klasse: DIBt 100, E1
Dickenbereich: ≤ 12 mm

hergestellt durch

Homanit GmbH & Co. KG
Niederlosheimer Straße 109
66679 Losheim am See
Deutschland

von der bauaufsichtlich anerkannten Überwachungsstelle (NDS 08)

Fraunhofer-Institut für Holzforschung
Wilhelm-Klauditz-Institut WKI
Bienroder Weg 54 E, 38108 Braunschweig, Deutschland

gemäß Überwachungsvertrag Nr. 0631 vom 24. Oktober 2008 durchgeführt wurde. Dabei wurde festgestellt, dass die personellen und gerätemäßigen Voraussetzungen für die ordnungsgemäße Herstellung des Produktes erfüllt sind und die werkseigene Produktionskontrolle den Anforderungen gemäß „Richtlinie über die Klassifizierung und Überwachung von Holzwerkstoffplatten bezüglich der Formaldehydabgabe (DIBt-Richtlinie 100)" vom Juni 1994 entspricht. Diese Bescheinigung ist Bestandteil des Überwachungsberichtes und gilt für die folgenden 8 Monate. Die kontinuierliche Fremdüberwachung muss zweimal jährlich stattfinden.

Dipl.-Ing. Harald Schwab
Leiter der bauaufsichtlich anerkannten
Prüf-, Überwachungs- und Zertifizierungsstelle
Braunschweig, den 17. Mai 2016

Durch die oberste Bauaufsichtsbehörde anerkannte Überwachungs- und Zertifizierungsstelle
ÜZ
Wilhelm-Klauditz-Institut WKI Braunschweig

DAkkS
Deutsche
Akkreditierungsstelle
D-ZE-11140-02-00

E1
DIBt-Richtlinie 100

CERTIFICATE
OF COMPLIANCE

GREENGUARD

PRODUCT CERTIFIED FOR
LOW CHEMICAL EMISSIONS
UL.COM/GG
UL 2818

Formica Group Europe

Formica Laminate

Restrictions:

19877-410
Certificate Number

04/06/2011 - 10/28/2016
Certificate Period

Certified
Status

UL 2818 - 2013 Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Products tested in accordance with UL 2821 test method to show compliance to emission limits in UL 2818, Section 7.1.

Environment

GREENGUARD Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC(A)	-	0.50	mg/m³
Formaldehyde	50-00-0	61.3 (50 ppb)	µg/m³
Total Aldehydes (B)	-	0.10	ppm
Particle Matter less than 10 µm (C)	-	50	µg/m³
4-Phenylcyclohexene	4994-16-5	6.5	µg/m³
Individual VOCs (D)	-	1/10th TLV	-

(A) Defined to be the total response of measured VOCs falling within the C_6 – C_{16} range, with responses calibrated to a toluene surrogate.

(B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.

(C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.

(D) Allowable levels for chemicals not listed are derived from 1/10th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).

5.6. Rakoll ECO3

Fraunhofer Wilhelm-Klauditz-Institut Holzforschung

Quality Assessment

WKI - FRAUNHOFER-INSTITUT · Bienroder Weg 54 E · D-38108 Braunschweig

Dipl.-Ing. Harald Schwab
Head of the Testing,
Supervision and
Certifying Body

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Official in charge: Bettina Meyer
Phone +49 (0) 531/2155-375
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E-mail bettina.meyer@wki.fraunhofer.de

H. B. Fuller Deutschland GmbH
Henriettenstraße 32

31582 Nienburg
Germany

Your reference	Your message dated	Our reference	Braunschweig,
		Mey	20 October 2008

Test report No. B 3536 / 2008

Customer:	H. B. Fuller Deutschland GmbH Henriettenstraße 32 31582 Nienburg Germany
Receipt of sample:	21 May 2008
WKI-ID-No.:	1538/08
Start of test:	7 Ocotober 2008
Objective of the test:	Determination of formaldehyde release

Content of the test report:

This test report comprises 3 pages and 1 figure.

EC Notified 0765	Testing, Supervising and Certifying Body authorized by the Principal Authority for Supervision of Construction
Deutscher Akkreditierungs Rat DAP-PL-2071.00	Testing laboratory authorized by DAP Deutsches Akkreditierungssystem Prüfwesen GmbH according to DIN EN ISO/IEC 17025 The authorization covers the test methods listed in the certificate

Fraunhofer Wilhelm-Klauditz-Institut Holzforschung

Quality Assessment

1. Task and test material

The Fraunhofer-Institut fur Holzforschung, Wilhelm-Klauditz-Institut (WKI), was entrusted by Messrs. H. B. Fuller Deutschland GmbH in 31582 Nienburg (Germany) with the determination of formaldehyde emission value of an adhesive sample named "RAKOLL® ECO 3". The test material was chosen, marked and sent for testing to the WKI by the client.

2. Execution of the test

As to the determination of the formaldehyde emission potential the adhesive was appliqued one-sided on glass plates (referring to manufactures' instruction with a quantity of 200 g/m²) with a surface of 1 m² capable of emission and positioned in a closed chamber with a volume of 1 m³.

During the test the temperature was kept at 23°C ± 0.5 K, the relative humidity of the air was kept at 45 ± 3 % and the air exchange rate was adjusted to 1 h^{-1}. Therefore, the relationship between air exchange level and room load was 1.

The formaldehyde concentration in the chamber was measured one hour after loading and furthermore twice a day until the equilibrium concentration was reached. To this end a gas quantity of at least 0.12 m³ each was taken from the ambient air using gas sampling equipment and led through gas washing bottles filled with absorption liquid. The absorbed formaldehyde was determined photometrically and/or fluorimetrically according to the acetylacetone method.

The test climatic and analytical test conditions correspond to DIN EN 717-1:2005-01. The requirements published in the Federal Health Bulletin 34, 10 (1991), p. 488 - 489, regarding the fulfilment of the Regulation on the Prohibition of Chemicals - ChemVerbotsV -, appendix to § 1, section 3, are also fulfilled.

Fraunhofer Wilhelm-Klauditz-Institut Holzforschung

Quality Assessment

3. Test result

For the tested adhesive sample named with "RAKOLL® ECO 3" sent from Messrs. H. B. Fuller Deutschland GmbH in 31582 Nienburg (Germany) as tested as described in Ch. 2 a formaldehyde concentration of 0.01 ppm was determined in the 1 m³ chamber (test period: 243 hours – see figure – blank value of the chamber: ≤ 0,005 ppm;1 ppm ≙ 1.24 mg HCHO/m³ air at 23°C and 1013 hPa).

According to the Regulation on the Prohibition of Chemicals an admissible maximum value of 0.1 ppm of formaldehyde measured in a test chamber applies to wood-based materials, determined as an equilibrium concentration.

We draw the attention to the fact that the effected test was made as a material parameter and not as a classifying test.

Bettina Meyer
Official in charge

Dipl.-Ing. Harald Schwab
Head of Testing, Supervision and Certifying Body

Fraunhofer Wilhelm-Klauditz-Institut Holzforschung

Quality Assessment

Enclosure to test report No. B 3536 / 2008
dated 20 October 2008

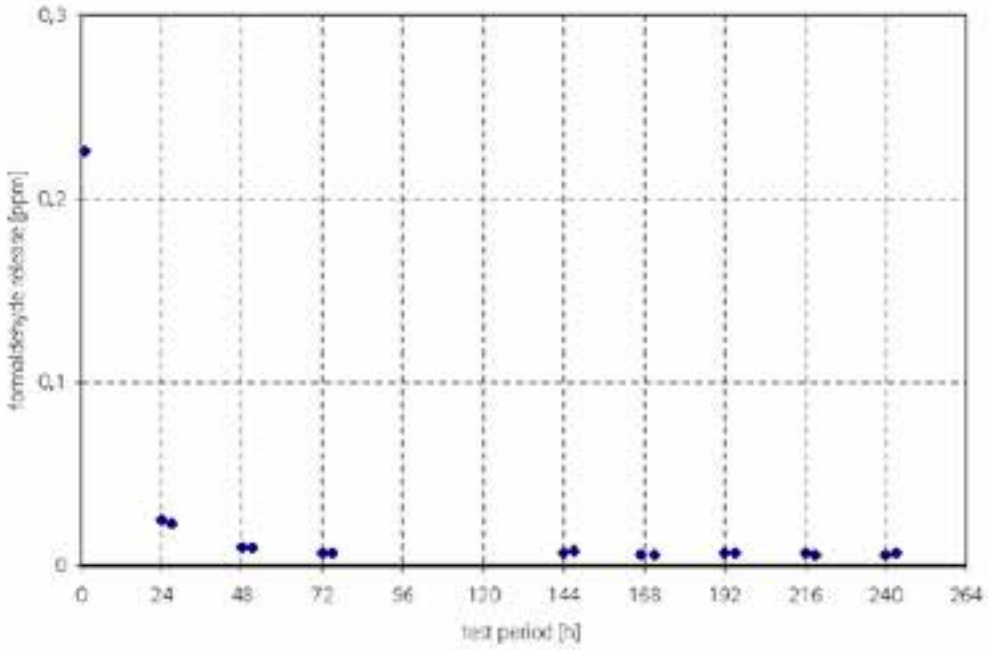

Figure: Determination of formaldehyde release using a 1 m³ chamber of an adhesive sample named "RAKOLL® ECO 3" of Messrs. H. B. Fuller Deutschland GmbH in 31582 Nienburg (Germany)

Ausschuss zur gesundheitlichen Bewertung von Bauprodukten

Committee for Health-related Evaluation of Building Products

AgBB – August 2018
Updated List of LCI values 2018 in Part 3

Ausschuss zur gesundheitlichen Bewertung von Bauprodukten

Committee for Health-related Evaluation of Building Products

This version applies from the date it is published. The version it replaces will continue to be valid for one more year. This also applies to updated lists of LCI values. However, old and new versions must each be applied as a complete document; they may not be mingled.

Requirements for the Indoor Air Quality in Buildings: Health-related Evaluation Procedure for Emissions of Volatile Organic Compounds (VVOC, VOC and SVOC) from Building Products

1 Introduction

The health and comfort of the occupants of indoor spaces is influenced by the indoor climate in a room (in particular temperature, air change rate and relative humidity) and by potential indoor air pollutants. Such pollutants may be emitted from a variety of sources. Among these sources, building products are of particular importance since their selection is often not within the occupants' choice and many of them cover large surface areas in a room.

Renovation and construction measures carried out under the legal requirements of the energy efficiency of buildings (Energy Saving Ordinance, EnEV 2015) must ensure that a healthy indoor air quality is guaranteed for room occupants during the use phase. To prevent draught as well as heat and energy losses, the shell of energy-efficient buildings is often so airtight that the air change necessary for reasons of hygiene is not achieved. The results are humidity and pollution load of the indoor air by volatile organic compounds. Unless sufficient air exchange takes place, room occupants face avoidable risks to their comfort, health and performance. Therefore, in building construction and extensive building renovation, the development of a ventilation concept (provided, most commonly, by airing several times a day by opening windows wide and/or the use of mechanical ventilation systems) by architects or planners is a mandatory requirement and to be implemented by building operators .

Healthy indoor air as an objective in building regulations
In Germany, the use of building products is subject to the provisions of the building regulations of the Federal States (Länder). These provisions require built structures to be designed, built, and maintained in such a way that life, health or the natural environment are not endangered (Article 3, Standard Building Code (Musterbauordnung) [MBO, 2016]). Building products used in the construction or integrated into the building have to satisfy these requirements so that

chemical, physical or biological influences do not result in any hazard or unacceptable nuisance (Article 13 MBO).

On 4 April 2011, Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 setting out harmonised conditions for marketing building products was published in the European Official Journal L 88/5. On 1 July 2013, it fully superseded the Construction Products Directive. Implementation of the new Construction Products Regulation (BauPVO) into national law is not required as European regulations take effect immediately in all Member States.

One of the objectives of the German Federal States' (Länder) building regulations and the EU Construction Products Regulation is to protect the occupants health. "Hygiene, Health and Environment" are among the basic requirements for construction works that must be ensured in the form of "essential characteristics" of the installed construction products. The Regulation allows EU Member States in their national regulations to require that the health of building occupant must not be endangered. The essential characteristics of building products must be disclosed in the declaration of performance. Whether the current level of requirements in Germany has been met has to be checked before use in indoor spaces [MBO, 2016; MVV TB 2017). In this context, the prevention and control of indoor pollutants, e.g. volatile organic compounds (VOC) is explicitly covered (Annex I, Construction Products Regulation (No 305/2011)).

The European Union recognised the inadequate implementation of essential requirements for building products regarding health protection, so issued a mandate to CEN in 2005. The mandate[1] envisaged the development of horizontal assessment methods for dangerous substances incorporated in and emission from building products. For this purpose, CEN established the technical committee CEN TC 351. The horizontal assessment methods to be developed by this committee will form the basis for the technical specifications for building products in standardisation and for European Technical Assessments. As a result of the standardisation work, the EN 16516:2018-01: Construction products – Assessment of the release of dangerous substances – Determination of emissions into indoor air, was published. This standard is also used in national approvals for evaluating emissions of volatile organic compounds.

AgBB tasks for ensuring a healthy indoor air quality in built structures

The Committee for Health-related Evaluation of Building Products, *AgBB*[2] *(Ausschuss für die gesundheitliche Bewertung von Bauprodukten)* was mandated by the Gesundheits- and Bauministerkonferenz to create the fundamentals for developing building regulations for protection against indoor health risks. AgBB considers the establishment of fundamentals that are traceable and objective as one of its main tasks for a uniform health-related assessment of building products which satisfies the requirements specified in the building regulations of the German Federal States (Länder) and the European Construction Products Regulation. The

[1] Mandate M366 "Development of horizontal standardised assessment methods for harmonised approaches relating to dangerous substances under the Construction Products Directive (CPD)". European Commission, DG Enterprise, Brussels, 16 March 2005.

[2] Composed of representatives of the health authorities of the Federal States (*Länder*), the German Environment Agency (UBA) with the AgBB Secretariat, the German Institute for Building Technology (DIBt), the Conference of the *Länder* Ministers and Senators responsible for urban development, construction and housing (ARGEBAU), the Bundesanstalt für Materialforschung und –prüfung (BAM), the Federal Institute for Risk Assessment (BfR) and Coordination Committee 03 – hygiene, health and environmental protection - of the Building and Civil Engineering Standards Committee of the German Institute for Standardisation (DIN-KOA 03)

AgBB also supports efforts to harmonise the health assessment of emissions from building products in Europe [ECA 27, 2012; ECA 29, 2013].

The Committee has developed a scheme for health-related evaluation of VOC emissions from building products used for indoors application [AgBB, 2000]. Within this scheme, volatile organic compounds include compounds within the retention range of C_6 to C_{16} (n-hexane up to and including n-hexadecane), which are considered both as individual substances and as a sum parameter following the TVOC concept (TVOC = Total Volatile Organic Compounds). It also includes very volatile (VVOC) and semi volatile (SVOC) organic compounds within the retention range below C_6 and from C_{16} up to C_{22}, respectively [ECA 18, 1997a; ECA 19, 1997b].

The scheme was extensively discussed with representatives of manufacturers and professionals after having been first published in 2000 and at the end of its introductory phase from 2002 to 2004 [Proceedings of the technical dialogues in 2001 and 2004; International Conference, 2007]. As a result of these processes, the scheme was revised [AgBB, 2005] and the German Institute for Building Technology (Deutsches Institut für Bautechnik (DIBt)) incorporated the evaluation scheme into its approval guidelines for the health-related evaluation of building products [DIBt, 2004, 2010]. From 2017, the AgBB evaluation scheme has become the basis for the "Health protection requirements for physical structures" (German: „Anforderungen an bauliche Anlagen bezüglich des Gesundheitsschutzes (ABG)"). The ABG were published in 2017 as part of the Model Administrative Provisions - Technical Building Rules (MVV TB) and have been successively adopted by the German Federal States (Länder) (as of January 2018).

The minimum requirements of the aforementioned building regulations for health protection with regard to VOC emissions can be met by adhering to the test values set in the scheme. Nevertheless, the scheme also endorses manufacturers' initiatives to produce products with lower emissions [Däumling, 2012]. Manufacturers can therefore declare better performance parameters (VOC emissions) for their products, e.g. by means of labels [ECA 24, 2005; ECA 27, 2012].

2 Scientific fundamentals for the health-related evaluation of volatile organic compounds emitted from building products

Literature about the effects of indoor air pollution on human health is extensive [see e.g. ECA 10, 1991b; WHO, 2000, 2010; Ad-hoc, 2007]. Acute and/or long-term effects of volatile organic compounds may range from odour perception and irritation of the mucous membranes of the eyes, nose and throat to systemic effects. This also includes effects on the nervous system, allergenic or allergy promoting and carcinogenic, mutagenic or reprotoxic properties.

National and international bodies, in particular the European Collaborative Action (ECA) "Indoor Air Quality and its Impact on Man", dealt with the evaluation of VOC emissions from building products in the 1990s. Within ECA, which now works under the title "Urban Air, Indoor Environment and Human Exposure", experts from the EU Member States and from Switzerland and Norway are thoroughly examining the specific knowledge available in Europe on a wide range of indoor issues. The results of their work are published in reports that contain sufficiently detailed information to be considered as 'pre-normative' documents. One of them is Report No 18 "Evaluation of VOC Emissions from Building Products" in which a flow chart describing the procedure for evaluation of emissions from floor coverings is given as an example [ECA 18, 1997a].

The toxicological evaluation of substances emitted from building products is based on the determination of concentration levels below which there is no reason to expect adverse effects from the individual substance (LCI – lowest concentration of interest for the individual substance).

The most comprehensive evaluation system for chemical substances is available for the workplace in the form of occupational exposure limit values (OELs). However, where hazardous substances are handled under typical conditions in workplaces, much higher substance concentrations than under indoor living conditions are generally encountered. In addition, much shorter exposure times occur at workplaces in comparison to indoor situations. When extrapolating to indoor living spaces, this must be accounted for by suitable factors, as must the inclusion of particularly sensitive population groups and the absence of exposure monitoring through measurements and occupational health surveillance [ECA 18, 1997a]. A pragmatic approach based on these considerations has until now been applied in the evaluation of building products as one procedure to derive auxiliary parameters referred to as LCI (Lowest Concentration of Interest)[3] values.

Since 2011, a European initiative has been working to harmonise emissions assessment in Europe by means of LCI values. The working group has compiled a comprehensive list of emission-relevant substances, described the procedure it uses to derive EU-LCI values and published a harmonised list of LCI values for some 115 substances [ECA 29, 2013; https://ec.europa.eu/growth/sectors/construction/eu-lci_en]. AgBB usually adopts published EU-LCI values into updates of the German LCI list (see Annex 6) in order to support the harmonisation of the health-based evaluation of building product emissions in Europe.

The evaluation criteria are based on the assessment of individual compounds although building occupants are exposed to a multitude of substances. This is accounted for by summing evaluated individual VOC concentrations in the risk index "R" and by means of the total concentration of volatile organic compounds (TVOC) [Seifert, 1999; Ad-hoc, 2007; ECA 27, 2012; DIN ISO 16000-6, 2012; EN 16516, 2018].

The R-value is the hazard index for assessing combination effects of substances in the substance mixture formed in indoor air from VOC emitted by a building product. It is based on the recommendation of the European expert group European Collaborative Action on Man in the ECA report no. 18 and confirmed in the ECA report no. 29 [ECA 18, 1997a; ECA 29, 2013]. The Scientific Committee on Health and Environmental risks, SCHER, of the European Commission Directorate-General Health and Consumers argued for the health relevance of combination effects in its opinion on indoor air quality and for the necessity to assess them with such an additive approach in 2007 [SCHER, 2007]. The same conclusion was drawn in 2012 in the opinion on toxicity and assessment of substance mixtures by the three acknowledged scientific committees SCHER, SCCS and SCENIHR assigned by the Directorate General Health and Consumers [SCHER/SCENIHR/SCCS, 2012]

The scientific background for the TVOC concept that distinctly shows a concentration dependency for health effects caused by the sum of defined volatile organic compounds [ECA 19, 1997b; Ad-hoc, 2007] is acknowledged in controlled human studies and epidemiological research. In order to avoid an unlimited total concentration of substance emissions and thus to

[3] In the original German text the acronym NIK is used standing for Niedrigste interessierende Konzentration, which is the translation of LCI.

protect against adverse health effects, the relevant ECA reports stipulate an upper limit for TVOC as a minimum requirement for adequate health protection.

3 Sensory testing

Emissions from building products are often associated with the perception of odours which may result in annoyance and health impairment. Sensory testing is therefore an important element in the evaluation of emissions from building products. In the past, different measurement methods have been used for sensory testing [e.g. Fischer et al., 1998; ECA 20, 1999], but there was no harmonised, generally accepted procedure for odour assessment. Research projects on measurement of odour emissions from building products using test chambers [UBA Texte, 2007 and 2011] have developed a method which has now become a national [VDI 4302 Part 1] and an international [ISO 16000-28] standard.

Based on current knowledge on sensory testing using the test chamber method according to ISO 160000-28, it is now possible to determine and objectively evaluate odour emissions from building products using the parameters of perceived intensity and hedonic note within the AgBB evaluation scheme. In order to gain further experience by applying the test method to different building products, the AgBB conducted a pilot phase for sensory testing between 2012 and 2015. The aim of the pilot phase was to examine different building products, test the applicability of the proposed method and carry out two interlaboratory comparisons in cooperation with representatives of relevant industrial associations, manufacturers and test laboratories. Studies by the Fraunhofer Wilhelm-Klauditz-Institute (WKI in Braunschweig) showed that the ISO 16000-28 (version December 2012) does not satisfactorily describe the measurement method [WKI, 2016]. During the pilot phase, BAM carried out two interlaboratory comparison tests, the first taking into account ISO 16000-28 and the standard VDI 4302 part 1 and in the second test, a standard operating procedure [UBA Texte 2014 and 2015]. 8 and 11 test laboratories respectively participated successfully in the interlaboratory comparisons. BAM conducted the next regular interlaboratory comparisons on VOC and sensory testing in 2016. 14 test laboratories participated successfully and the results were comparable to the previous tests.

The findings of the pilot phase can be used to specify the ISO 16000-28 through additional measurement requirements. With these additional specifications, the measurement procedure is suitable for assessing the perceived intensity. The necessary revision of the ISO 16000-28 is currently in progress.

Use of low-odour building products is a prerequisite for low-odour indoor spaces. According to Article 13 of the MBO, buildings must be designed and be fit for use in such a way that due to (…) chemical, physical or biological impacts hazards or unacceptable nuisance shall not result. The AgBB considers it an unacceptable nuisance when more than 30% of an untrained, large group of people interviewed rate the odour of building products as unacceptable. Based on such interviews [UBA Texte, 2011] and from health and hygiene perspectives, the AgBB sets the perceived intensity of 7 pi as a preliminary assessment criterion for the sensory testing of a building product. So far, only a few studies have investigated odour emissions from building products and odour intensity of the indoor air resulting from the installation of various building products [UBA Texte, 2011 and 2017].

For the time being, the AgBB recommends sensory testing of building products to be conducted on voluntary basis. The AgBB also recommends continuing the investigation of the effects of odour-intensive building products on the odour load of indoor spaces.

4 Measurement and evaluation of VOC emissions from building products

4.1 Test chamber method for VOC emissions measurement

VOC emissions from building products can be suitably measured in standardised test chambers. Important parameters that have an influence on the result are temperature, air change rate, relative humidity, air velocity in the test chamber, the amount or surface area of the material in the chamber and the method of sample preparation. The influence of these and other parameters became evident in international interlaboratory comparisons [ECA 13, 1993; ECA 16, 1995]. Based on the results of these tests and an earlier publication on the test procedure [ECA 8, 1991a], international standards for the determination of emissions from building products were published [ISO 16000-9 to -11]. Parts 9 and 10 describe the procedure when using a test chamber and a test cell respectively. Part 11 covers sampling, sample storage and preparation of test specimens. The EN 16516:2018-01 further specifies the test conditions in order to improve measurement reliability and reproducibility. Within the evaluation of volatile organic compounds emissions under the AgBB scheme, the total volatile organic compounds (TVOC) must be determined as described in chapter 8.2.6.1 paragraph 2: sum of all volatile organic compounds (target compounds[4] and non-target compounds[4], identified and non-identified compounds), $TVOC_{spez.}$

4.2 Structural conditions and exposure scenarios

Room occupants are exposed to volatile organic compounds in buildings due to emissions from building products. Generally, the substances are absorbed during breathing (by inhalation). Health-related evaluation of a building product is based on the indoor air concentrations of volatile organic compounds emitted from that product. The evaluation cannot be carried out using only the area-specific emissions rates of the building product as determined in test chamber measurements according to the AgBB scheme (see 4.1). Rather, it is necessary to additionally consider the indoor air situation likely to be encountered under practical conditions. The exposure scenario creates the link between product emission and concentration in indoor air. Thus, the evaluation must take into account the emissions from the product, the size of the room, the air change rate and the emitting surface area of the building product to be installed in the room.

Under current German building regulations, the building shell of newly constructed or extensively renovated buildings is increasingly fitted with airtight insulation for energy reasons. This reduces the air exchange with outdoor air unless compensated by increased active ventilation. From the viewpoint of air quality, regular air exchange with ambient air is necessary to reliably transport humidity (e.g. produced by cooking or washing) as well as odours and emissions out of indoor spaces and create the prerequisites for a healthy indoor climate.

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[4] Target compounds are the substances listed in the LCI list in Table 1 of this document.
Non-target compounds are substances without LCI values.

In order to take both energy and air quality aspects sufficiently into account, the health-related assessment in the AgBB scheme applies for a minimum air change rate of 0.5/h [DIN 1946-6]. This air change rate also applies for the reference room according to the EN 16516:2018-01. The air change rate of 0.5/h defined in the AgBB scheme presupposes regular (several times during the day) ventilation if no ventilation system exists. This is necessary to prevent harmful consequences in terms of hygiene. Increased intensive airing by the occupants is necessary and especially after the introduction of new materials (e.g. during renovation). Furthermore, in low energy buildings, the aim must be to consistently use low-emission building products and other materials for indoor use.

The AgBB requirements also must take into account a broad range of building types and uses as possible. Since most of the building stock in Germany still consists of energy-inefficient old buildings, the requirements must consider the different air change rates in these buildings. From the perspective of indoor air quality, an air change rate of 0.5/h remains the minimum air change rate target for all buildings, both old and new. It is therefore deemed to be an appropriate basis for the calculations in connection with evaluation of test chamber emission results.

$$C = \frac{E_a \cdot A}{n \cdot V} = \frac{E_a}{q} \qquad (1)$$

Equation (1) describes the indoor air concentration C, resulting from a building product, as a function of the area-specific emissions rate E_a [µg/(m² h)] of the product, the air change rate n [h^{-1}] in the room considered and the ratio of product surface area A [m²] to the room volume V [m³]. Parameters n, A and V can be combined into the new parameter q [m³/(h m²)] called the area-specific air change rate.

To ensure that the measurement results obtained in a test chamber are transferrable to the reference room, the AgBB scheme requires a loading factor to be set for the test chamber measurement that takes the product's intended use into account. For some standard uses, the following standardised loading factors have been defined:

- 1.0 m^2/m^3 for walls;
- 0.4 m^2/m^3 for floor or ceiling;
- 0.05 m^2/m^3 for small surfaces, e.g. a door;
- 0.007 m^2/m^3 for very small surfaces, e.g. sealants.

These loading factors correspond to the specifications in the EN 16516:2018-01.

For building products and uses that deviate from the above standard uses, a loading factor as representative as possible must be calculated and the nearest standard loading factor be used. If the intended use suggests that a product might be used on more than one of the above surfaces, the relevant surface areas and loading factors must be summed. The standardised loading factors for such uses are:

- 0.8 m^2m^3 for walls and ceiling;
- 1.4 m^2/m^3 for walls and ceiling or walls and floor;
- 1.8 m^2/m^3 for walls, floor and ceiling.

The loading factor applied must be stated in the test report and documented clearly for the user.

The reference room in the AgBB scheme and EN 16516:2018-01 has a base area of 3 m x 4 m and a height of 2.5 m.

4.3 Evaluation scheme for volatile organic compounds

For health evaluation, a product has to undergo a series of tests as shown in the flow chart in Fig. 1. The procedure starts from a product wrapped in an airtight cover. The start of the experiment (t_0) is defined as the time at which the product to be tested is unwrapped and placed into the test chamber or cell. The product remains in the test chamber or cell over the entire period of the test. For certain product groups it is necessary to define special test conditions. These specific requirements are defined separately (see "Health protection requirements for physical structures" (German: „Anforderungen an bauliche Anlagen bezüglich des Gesundheitsschutzes (ABG)", Model Administrative Provisions - Technical Building Rules (MVV TB), [MVV TB, 2017]). They may also include criteria definition for anticipated termination of the emission measurement. In principle, anticipated termination of the test is allowed no earlier than 7 days after placing the test specimen into the chamber. The prerequisite for this is that the values determined are less than half the requirements for the 28-day values and no significant increase in the concentration of individual substances is observed in comparison to the measurement on day 3. The fulfilment of these criteria has to be sufficiently demonstrated by the testing body.

The determination of organic compounds in the vapour phase of the test chamber air shall be carried out in accordance with EN 16516. Quantification of the identified substances with LCI values and carcinogenic substances has to be done using their individual calibration factors. The quantification of the identified substances without LCI values and non-identified ("unknown") substances has to be carried out based on toluene equivalents (see EN 16516).

The following definitions apply in the AgBB scheme:
VVOC: all individual substances within the retention range < C_6
VOC: all individual substances within the retention range C_6 - C_{16}
$TVOC_{spez}$[5]: sum of the concentration of all individual substances with concentrations equal to or greater than 5 µg/m³ within the retention range C_6 - C_{16} (between n-hexane and up to and including n-hexadecane)
SVOC: all individual substances within the retention range > C_{16} - C_{22}
TSVOC: sum of the concentration of all individual substances with concentrations equal to or greater than 5 µg/m³ within the retention range > C_{16} - C_{22}.

Determination of the $TVOC_{spez}$ has to be carried out as described in chapter 8.2.6.1 paragraph 2 of the EN 16516: "the sum of all identified target compounds (quantified using authentic standards) plus all identified non-target compounds and non-identified compounds (quantified using the TIC response factor for toluene) eluting in a defined section of the chromatogram, after correcting for blank values of the respective compounds quantified in the same way".

In the AgBB scheme, the identification of all individual substances is based on a presumed uniform detection limit of 1 µg/m³ in order to qualitatively cover the emission spectrum as fully as possible. It is desirable to aim for a high degree of identification in order to enable an individual substance evaluation.

All individual substances have to be quantified as required and need to be considered individually and in summation if their concentration is equal to or greater than 5 µg/m³.

[5] The ABG states (p. 261 of the MVV TB, 2017): $TVOC_{(g-s)}$ (total volatile organic compounds) is the total concentrations of substance-specific target compounds (LCI substances) and non-identified concentrations quantified using the toluene equivalent and non-target compounds with individual concentrations of 5 µg/m³ and above.

Exceptions apply to carcinogenic substances belonging to EU categories 1A and 1B according to the GHS system (Regulation (EC) No 1272/2008 Annex VI Table 3.1) (see 4.3.1).

The following explanations are given to the flow chart in Figure 1:

4.3.1 Measurement and testing after 3 days

- $TVOC_{spez3}$

A product satisfies the criteria if the $TVOC_{spez}$ value after 3 days ($TVOC_{spez3}$) is ≤ 10 mg/m³.

- Carcinogenic substances

Every building product has to meet the general requirement of not emitting any carcinogenic, mutagenic or reprotoxic substances. Emission of carcinogenic substances belonging to EU categories 1A and 1B is tested at this initial stage of the flow chart. Substances with mutagenic or reprotoxic properties and those with potential carcinogenic effects belonging to EU category 2 are checked within the LCI concept (see Part 3) and assigned higher safety factors if necessary. Carcinogens have to be quantified using their individual calibration factors.

No carcinogen belonging to EU categories 1A and 1B may exceed a concentration of 0.01 mg/m³ after 3 days.

Excepted from this requirement are certain substances classified as 1A or 1B carcinogens for which a threshold can be derived for the most sensitive endpoint at which a carcinogenic potential is no longer assumed. For these substances, a LCI value is derived on that basis and listed in Table 1.

4.3.2 Measurement and testing after 28 days

- $TVOC_{spez28}$

In order to assess the long-term behaviour of the VOC emissions from a building product, the $TVOC_{spez}$ value is determined again after 28 days. A product satisfies the criteria if the $TVOC_{spez28}$ value is ≤ 1.0 mg/m³. Products with a $TVOC_{spez28}$ value higher than that are rejected.

- Semi volatile organic compounds (SVOC)

Products that satisfy the criteria for VOC emissions but instead exhibit increased SVOC emissions should not be given advantages. To prevent this from happening, the SVOC concentration in the chamber air must also be determined.

A product satisfies the criteria if the sum of the SVOC (TSVOC) concentrations in the chamber air does not exceed 0.1 mg/m³. This corresponds to an additional content of 10 % of the maximum allowable $TVOC_{spez28}$ concentration of 1.0 mg/m³. Higher concentrations result in rejection.

Some SVOC LCI values are derived in individual cases. The SVOC for which LCI values were derived must be included in the calculation of the R-value and are not subject to the total value for SVOC of 0.1 mg/m³ after 28 days. The sum of $TVOC_{spez28}$ and the sum of all individual SVOC with LCI value may not exceed a concentration of 1.0 mg/m³ after 28 days.

- Very volatile organic compounds (VVOC)

Products that satisfy the criteria for VOC emissions but instead exhibit increased emission of VVOC should not be given an advantage in terms of health assessment. To meet this

requirement, the VVOC concentration in the chamber air must also be determined (see Note IV in the Annex).

Some VVOC LCI values are derived in individual cases. The VVOC for which LCI values were derived must be included in the calculation of the R-value but not in the $TVOC_{spez28}$ value.

- Carcinogenic substances

The emission of carcinogenic substances in EU categories 1A and 1B is measured again with an emphasis on the long-term behaviour from the occupant's point of view. No carcinogen of categories 1A and 1B may exceed the value of 0.001 mg/m³ after 28 days.

Excepted from this requirement are certain substances classified as 1A or 1B carcinogens for which a threshold can be derived for the most sensitive endpoint at which a carcinogenic potential is no longer assumed. For these substances, a LCI value is derived on that basis and listed in Table 1. These substances are dealt with in the same way as other VOC substances with LCI values (See 'Evaluation of individual substances').

- Sensory testing

Sensory testing for perceived intensity is firstly performed after 28 days on a voluntary basis. The perceived intensity is determined by a trained panel (ISO 16000-28:2012 chapter 10.3 and additional specifications in accordance with VDI 4302 Part 1). Sensory testing is considered passed if an odour intensity of 7 pi is not exceeded.

- Evaluation of individual substances

In addition to evaluating the emissions of a product via the $TVOC_{spez}$ value, the evaluation of individual volatile organic compounds is also necessary. For this purpose all compounds whose concentration in the chamber air equals or exceeds 1 µg/m³ are first identified, listed with their CAS number, and quantified according to the following:

a) VVOC, VOC and SVOC assessable via LCI

For a large number of volatile organic compounds found in indoor air a list of LCI values is contained in the Annex. The details of how these LCI values have been derived are documented in the introduction to the list.
Listed substances whose concentrations in the test chamber air exceed 5 µg/m³ are evaluated based on LCI. They are quantified using their individual calibration factors.

For the evaluation of each compound *i*, the ratio R_i is established as defined in equation (2).

$$R_i = C_i / LCI_i \qquad (2)$$

where C_i is the chamber concentration of compound *i*. For $R_i < 1$, it is assumed that there will be no effects. If several compounds with a concentration > 5 µg/m³ are detected, additive effects are assumed and then R, the sum of all R_i, shall not exceed the value 1.

$$R = \text{sum of all } R_i = \text{sum of all ratios } (C_i / LCI_i) \leq 1 \qquad (3)$$

Products which do not fulfil this condition are rejected.

b) VOC not assessable via LCI

In order to avoid the risk of a positive evaluation of a product which emits larger quantities of non-assessable VOC, a limit is set for those VOC which cannot be identified or do not have a LCI value. This limit equals 10 % of the permitted $TVOC_{spez28}$ value for the sum of such substances. A product meets the criteria when the sum of such VOC determined at concentrations ≥ 5 µg/m³ does not exceed 0.1 mg/m³. Higher concentrations result in rejection.

4.4 Conclusion

A building product which fulfils the requirements set out in the flow chart (see Figure 1) is suitable for use in enclosed building spaces from a health perspective in accordance with Articles 3 and 13 of the Standard Building Code (MBO). Irrespective of this, if the building product has passed the sensory testing, this must be documented additionally and separately.

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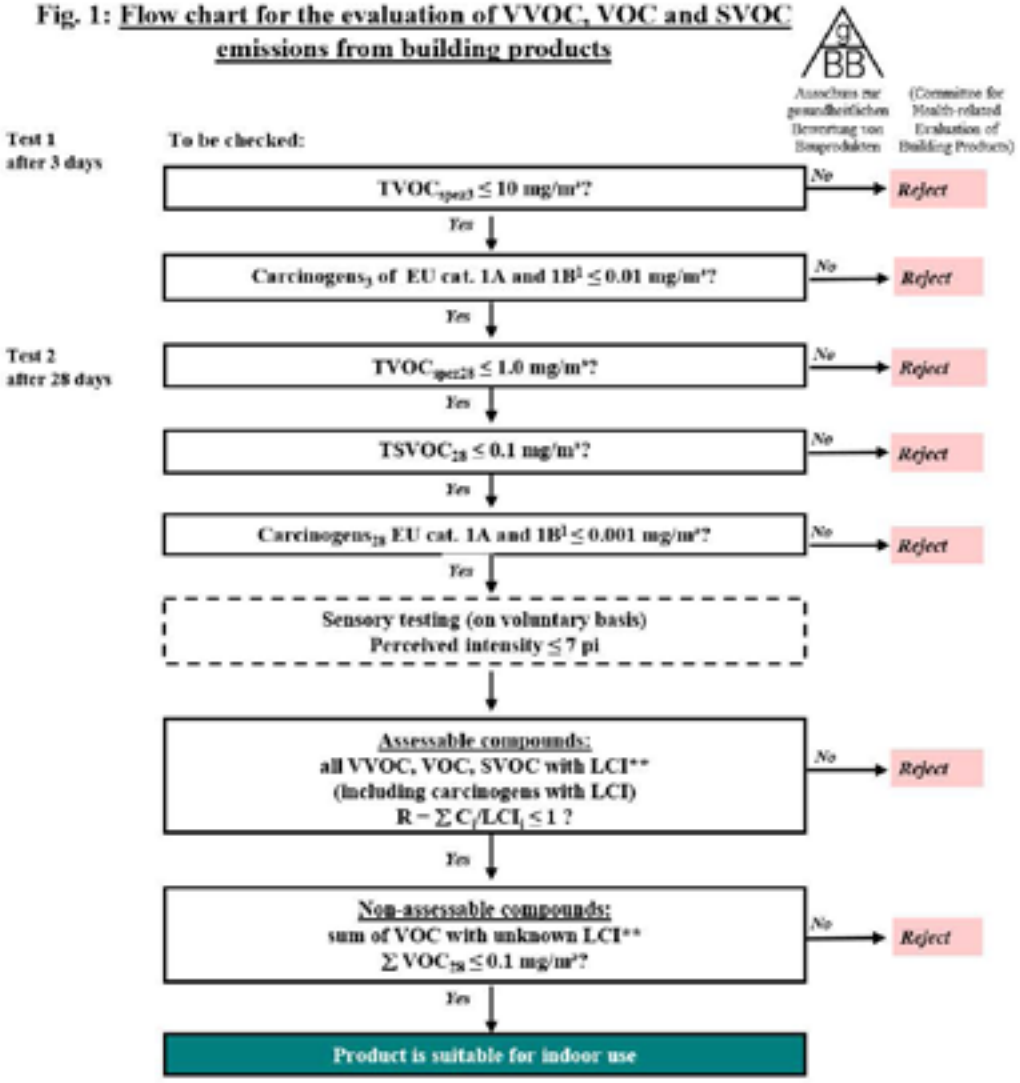
Fig. 1: Flow chart for the evaluation of VVOC, VOC and SVOC emissions from building products



* VVOC: retention range < C6, VOC, TVOC: retention range C6 – C16, SVOC: retention range C16 – C22 — **UBA II 1.3 AgBB 2018**
Emission chamber testing according to EN 16516:2018-01

** LCI: Lowest Concentration of Interest (German: NIK)

1 Classification according to Regulation (EC) No 1272/2008 Appendix VI Table 3.1, see notes in the text
https://www.umweltbundesamt.de/en/topics/health/commissions-working-groups/committee-for-health-related-evaluation-of-building

6. Annex

Establishing LCI values

6.1 Basic considerations

Volatile organic compounds are significant indoor air pollutants. German building regulations requires building products, which are important potential indoor sources of volatile organic compounds, to satisfy certain health-related requirements. This means that their emissions must be reduced to such a level that – assuming long-term occupancy of a room - concentrations in indoor air resulting from such emissions do not pose any threat to the health of sensitive persons, even under unfavourable but still realistic assumptions (concerning e.g. product loading factor, air change rate and indoor climate conditions). Here it is a precondition that regular ventilation is carried out (see Section 4.2). The health-related evaluation of emissions from building products is based on the derivation of substance-specific values, the LCI values (Lowest Concentration of Interest).

LCI values are used solely for evaluating emissions from building products on the basis of test chamber measurements. The derivation methodology and the way LCI values are applied make such values an adequate expression of the criteria required in building regulations to safeguard against health risk caused by volatile organic compounds, bearing in mind that the emissions from building products into indoor air result in multi-compound mixtures.

6.2 Derivation procedure

In deriving LCI values, an AgBB working group – complemented by manufacturers' specialists – has in the past mainly used existing health-based evaluations of substances at the workplace as proposed by an international expert group [ECA 18, 1997a] as a starting point.

At present, the criteria used for derivation of European LCI values (EU-LCI) require an extensive consideration of current original scientific literature. The reasons for the selection of reference studies are stated and applied safety factors are documented in line with guidance provided by ECHA [ECA 29, 2013; Däumling and Scutaru, 2013; https://ec.europa.eu/growth/sectors/construction/eu-lci_en]. In order to support the harmonisation of the health-based evaluation of building product emissions in Europe, AgBB usually adopts published EU-LCI values into updates of the German LCI list. Deviations are justified.

Until a list of substances consisting completely of evaluations based on the EU-LCI procedure is in place, the German LCI list will continue to include values that are based on existing assessment values for substances in the workplace or on individual substance evaluations (see AgBB evaluation scheme until 2015[6]).

Should substances for which EU-LCI values do not yet exist have to be newly evaluated, German LCI values may be set on the basis of the EU-LCI derivation procedure, stating the reasons for any deviations from this procedure. If necessary, a revision of German LCI values can be carried out according to the EU-LCI derivation procedure.

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[6] https://www.umweltbundesamt.de/en/topics/health/commissions-working-groups/committee-for-health-related-evaluation-of-building

If no LCI value can be derived for a substance due to insufficient data, the Working Group considers whether an individual substance assessment can be performed by referring to a substance class with similar chemical structure and comparable toxicological assessment. This "read across" corresponds to the procedure described in ECA Report 29 [ECA 29, 2013].

Substances which cannot be evaluated are subjected to a strict limitation of their total amount, within the AgBB scheme ("VOC with unknown LCI", see Figure 1).

For substances not yet included in the list of LCI values, manufacturers can apply for LCI values to be established by submitting available data to the AgBB. They may also submit substantiated requests for revision of an existing LCI value. An application form is available for download on the German Environment Agency's website[6].

6.3 Publication

LCI values are exclusively determined by the AgBB's LCI Working Group whose members also include representatives of industrial associations. The working group meets regularly to discuss LCI values to be added or revised. Its work priorities are determined by need, urgency and data availability. An updated version of the list of LCI values is published[6] at regular intervals and is provided in Table 1 along with brief notes on how the values were derived. Furthermore, at the same internet address[6], currently discussed or agreed changes of LCI values and new substances under consideration are given in the list of prospective LCI value changes for information before the next update. The list of EU-LCI values along with the documents on which they are based as well as a list with the members of the EU-LCI Working Group is available at https://ec.europa.eu/growth/sectors/construction/eu-lci_en.

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Table 1

List of LCI values

Closing date: July 2018

	Substance	CAS No.	LCI [µg/m³]	Remarks
1	**Aromatic hydrocarbons**			
1-1	Toluene	108-88-3	**2900**	Adoption EU-LCI value
1-2	Ethylbenzene	100-41-4	**850**	Adoption EU-LCI value
1-3	Xylene, mix of o-, m- and p-xylene isomers	1330-20-7	**500**	Adoption EU-LCI value
1-4	p-Xylene	106-42-3	**500**	Adoption EU-LCI value
1-5	m-Xylene	108-38-3	**500**	Adoption EU-LCI value
1-6	o-Xylene	95-47-6	**500**	Adoption EU-LCI value
1-7*	Isopropylbenzene (cumene)	98-82-8	**1700**	Adoption EU-LCI value
1-8	n-Propyl benzene	103-65-1	**950**	Adoption EU-LCI value
1-9	1-Propenyl benzene (ß-methyl styrene)	637-50-3	**2400**	Read across from α-methyl styrene
1-10	1,3,5-Trimethylbenzene	108-67-8	**450**	Adoption EU-LCI value
1-11	1,2,4-Trimethylbenzene	95-63-6	**450**	Adoption EU-LCI value
1-12	1,2,3-Trimethylbenzene	526-73-8	**450**	Adoption EU-LCI value
1-13	2-Ethyltoluene	611-14-3	**550**	Adoption EU-LCI value
1-14	1-Isopropyl-2-methylbenzene (o-cymene)	527-84-4	**1000**	Adoption EU-LCI value
1-15	1-Isopropyl-3-methylbenzene (m-cymene)	535-77-3	**1000**	Adoption EU-LCI value
1-16	1-Isopropyl-4-methylbenzene (p-cymene)	99-87-6	**1000**	Adoption EU-LCI value
1-17*	1,2,4,5-Tetramethylbenzene	95-93-2	**250**	Adoption EU-LCI value
1-18	n-Butylbenzene	104-51-8	**1100**	Adoption EU-LCI value
1-19	1,3-Diisopropylbenzene	99-62-7	**750**	Adoption EU-LCI value
1-20	1,4-Diisopropylbenzene	100-18-5	**750**	Adoption EU-LCI value
1-21	Phenyloctane and isomers	2189-60-8	**1100**	Adoption EU-LCI value
1-22	1-Phenyldecane and isomers	104-72-3	**1100**	Read across from ethylbenzene
1-23	1-Phenylundecane and isomers	6742-54-7	**1100**	Read across from ethylbenzene
1-24	4-Phenyl cyclohexene (4-PCH)	4994-16-5	**300**	Read across from styrene
1-25	Styrene	100-42-5	**250**	Adoption EU-LCI value
1-26	Phenyl acetylene	536-74-3	**200**	Read across from styrene
1-27*	2-Phenylpropene (α-methylstyrene)	98-83-9	**1200**	Adoption EU-LCI value
1-28*	Vinyl toluene (all isomers: o-, m-, p-methylstyrenes)	25013-15-4	**1200**	Adoption EU-LCI value
1-29	Other alkylbenzenes, unless individual isomers have to be evaluated otherwise		**450**	Read across from trimethylbenzenes
1-30*	Naphthalene	91-20-3	**10**	Adoption EU-LCI value
1-31	Indene	95-13-6	**450**	Adoption EU-LCI value
2	**Aliphatic hydrocarbons (n-, iso- and cyclo-)**			
2-1	3-Methylpentane	96-14-0		VVOC
2-2*	n-Hexane	110-54-3	**4300**	Adoption EU-LCI value
2-3	Cyclohexane	110-82-7	**6000**	Adoption EU-LCI value
2-4	Methylcyclohexane	108-87-2	**8100**	Adoption EU-LCI value
2-5	--			1)
2-6	--			1)
2-7	--			1)
2-8*	n-Heptane	142-82-5	**15000**	Adoption EU-LCI value

	Substance	CAS No.	LCI [µg/m³]	Remarks
2-9*	Other saturated aliphatic hydrocarbons, C6-C8		**14000**	Adoption EU-LCI value
2-10	Other saturated aliphatic hydrocarbons, C9-C16		**6000**	Adoption EU-LCI value
2-11	Other saturated aliphatic hydrocarbons, C17-C22		**1000**	SVOC Individual substance evaluation
2-12*	1-Dodecene	112-41-4	**750**	Individual substance evaluation
3	**Terpenes**			
3-1	3-Carene	498-15-7	**1500**	Adoption EU-LCI value
3-2	α-Pinene	80-56-8	**2500**	Adoption EU-LCI value
3-3	ß-Pinene	127-91-3	**1400**	Adoption EU-LCI value
3-4	Limonene	138-86-3	**5000**	Adoption EU-LCI value
3-5	Other terpene hydrocarbons		**1500**	Adoption EU-LCI value (This group includes all mono-terpenes, sesquiterpenes and their oxygen containing derivatives)
4	**Aliphatic mono alcohols (n-, iso- and cyclo) and dialcohols**			
4-1	Ethanol	64-17-5		VVOC
4-2	1-Propanol	71-23-8		VVOC
4-3	2-Propanol	67-63-0		VVOC
4-4	tert-Butanol (2-methyl-2-propanol)	75-65-0	**620**	Adoption EU-LCI value
4-5*	2-Methyl-1-propanol	78-83-1	**11000**	Adoption EU-LCI value
4-6	1-Butanol	71-36-3	**3000**	Adoption EU-LCI value
4-7	Pentanol (all isomers)	71-41-0 30899-19-5 94624-12-1 6032-29-7 548-02-1 137-32-6 123-51-3 598-75-4 75-85-4 75-84-3	**730**	Adoption EU-LCI value
4-8	1-Hexanol	111-27-3	**2100**	Adoption EU-LCI value
4-9	Cyclohexanol	108-93-0	**2000**	Adoption EU-LCI value
4-10	2-Ethyl-1-hexanol	104-76-7	**300**	Adoption EU-LCI value
4-11*	1-Octanol	111-87-5	**1700**	Adoption EU-LCI value
4-12	4-Hydroxy-4-methyl-pentane-2-one (diacetone alcohol)	123-42-2	**960**	Adoption EU-LCI value
4-13*	Other saturated n- and iso-alcohols, C4 to C10			Revaluation, see 4-16 and 4-17
4-14*	Other saturated n- and iso-alcohols, C11 to C13			Revaluation, see 4-16 and 4-17
4-15	1,4-Cyclohexanedimethanol	105-08-8	**1600**	Individual substance evaluation
4-16*	Other saturated n-alcohols, C7 to C13		**1700**	Read across from 1-octanol, saturated cyclic alcohols are excluded
4-17*	Other saturated iso-alcohols, C6 to C13		**300**	Read across from 2-ethyl-1-hexanol, saturated cyclic alcohols are excluded

	Substance	CAS No.	LCI [µg/m³]	Remarks
5	**Aromatic alcohols**			
5-1*	Phenol	108-95-2	**70**	Adoption EU-LCI value
5-2	BHT (2,6-di-tert-butyl-4-methylphenol)	128-37-0	**100**	Adoption EU-LCI value
5-3	Benzyl alcohol	100-51-6	**440**	Adoption EU-LCI value
6	**Glycols, Glycol ethers, Glycol esters**			
6-1*	Propylene glycol (1,2-Dihydroxypropane)	57-55-6	**2100**	Adoption EU-LCI value
6-2*	Ethanediol (ethylene glycol)	107-21-1	**3400**	Adoption EU-LCI value
6-3*	Ethylene glycol monobutylether	111-76-2	**1600**	Adoption EU-LCI value
6-4*	Diethylene glycol	111-46-6	**5700**	Adoption EU-LCI value
6-5	Diethylene glycol monobutylether	112-34-5	**670**	Adoption EU-LCI value
6-6*	2-Phenoxyethanol	122-99-6	**60**	Adoption EU-LCI value
6-7*	Ethylene carbonate	96-49-1	**4800**	Read across from ethanediol
6-8*	1-Methoxy-2-propanol	107-98-2	**7900**	Adoption EU-LCI value
6-9	2,2,4-Trimethyl-1,3-pentane diol monoisobutyrate	25265-77-4	**600**	Adoption EU-LCI value
6-10*	Butyl glycolate	7397-62-8		Reevaluation
6-11	Diethylene glycol monomethyl ether acetate (BDGA)	124-17-4	**850**	Adoption EU-LCI value
6-12	Dipropylene glycol monomethyl ether	34590-94-8	**3100**	Adoption EU-LCI value
6-13	2-Methoxyethanol	109-86-4	**3**[#]	EU-OEL: 3 110 µg/m³, Adoption of EU-LCI value is under discussion
6-14	2-Ethoxyethanol	110-80-5	**8**	EU-OEL: 8 000 µg/m³, Adoption of EU-LCI value is under discussion
6-15	2-Propoxyethanol	2807-30-9	**860**	Adoption EU-LCI value
6-16	2-Methylethoxyethanol	109-59-1	**220**	Adoption EU-LCI value
6-17*	2-Hexoxyethanol	112-25-4	**2000**	Read across from ethylene glycol monobutylether
6-18	1,2-Dimethoxyethane	110-71-4	**4**[#]	Read across from 2-methoxyethanol
6-19	1,2-Diethoxyethane	629-14-1	**10**	Read across from 2-ethoxyethanol
6-20	2-Methoxyethyl acetate	110-49-6	**5**	AGW: 4 900 µg/m³
6-21	2-Ethoxyethyl acetate	111-15-9	**11**	EU-OEL: 11 000 µg/m³; Adoption of EU-LCI value is under discussion
6-22*	2-Butoxyethyl acetate	112-07-2	**2200**	Adoption EU-LCI value
6-23	2-(2-Hexoxyethoxy)-ethanol	112-59-4	**740**	Read across from diethylene glycol-monobutyl ether
6-24	1-Methoxy-2-(2-methoxy-ethoxy) ethane	111-96-6	**28**	Adoption EU-LCI value
6-25	2-Methoxy-1-propanol	1589-47-5	**19**	Adoption EU-LCI value
6-26	2-Methoxy-1-propyl acetate	70657-70-4	**28**	Adoption EU-LCI value
6-27*	Propylene glycol diacetate	623-84-7	**1600**	Adoption EU-LCI value
6-28	Dipropylene glycol	110-98-5 25265-71-8	**670**	Adoption EU-LCI value
6-29	Dipropylene glycol monomethyl ether acetate	88917-22-0	**3900**	Read across from dipropylene glycol monomethyl ether
6-30	Dipropylene glycol mono-n-propylether	29911-27-1	**740**	Read across from diethylene glycol-monobutyl ether

[#] An evaluation within the framework of the LCI-concept will take place only from a measured concentration of 5 µg/m³.

	Substance	CAS No.	LCI [µg/m³]	Remarks
6-31	Dipropylene glycol mono-n-butylether	29911-28-2 35884-42-5	**810**	Read across from diethylene glycol-monobutyl ether
6-32	Dipropylene glycol mono-t-butylether	132739-31-2 (Mixture)	**810**	Read across from diethylene glycol-monobutyl ether
6-33	1,4-Butanediol	110-63-4	**2000**	Adoption EU-LCI value
6-34*	Tripropylene glycol monomethyl ether	20324-33-8 25498-49-1	**1200**	Individual substance evaluation
6-35	Triethylene glycol dimethyl ether	112-49-2	**7**	Read across from 2-methoxy-ethanol
6-36	1,2-Propylene glycol dimethyl ether	7778-85-0	**25**	Read across from 2-methoxy-1-propanol
6-37	2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	6846-50-0	**450**	Adoption EU-LCI value
6-38	Ethyl diglycol	111-90-0	**350**	Adoption EU-LCI value
6-39	Dipropylene glycol dimethyl ether	63019-84-1 89399-28-0 111109-77-4	**1300**	Adoption EU-LCI value
6-40*	Propylene carbonate	108-32-7	**1000**	Individual substance evaluation
6-41	Hexylene glycol (2-methyl-2,4-pentanediol)	107-41-5	**490**	MAK: 49 000 µg/m³
6-42	3-Methoxy-1-butanol	2517-43-3	**500**	Individual substance evaluation
6-43	1,2-Propylene glycol n-propylether	1569-01-3 30136-13-1	**1400**	Individual substance evaluation
6-44	1,2-Propylene glycol n-butylether	5131-66-8 29387-86-8 15821-83-7 63716-40-5	**1600**	Individual substance evaluation
6-45*	Diethylene glycol phenylether	104-68-7	**80**	Read across from 2-phenoxyethanol
6-46	Neopentyl glycol (2,2-dimethylpropane-1,3-diol)	126-30-7	**1000**	Individual substance evaluation
7	**Aldehydes**			
7-1	Butanal	123-72-8	**650**	VVOC Adoption EU-LCI value
7-2	Pentanal	110-62-3	**800**	Adoption EU-LCI value
7-3	Hexanal	66-25-1	**900**	Adoption EU-LCI value
7-4	Heptanal	111-71-7	**900**	Adoption EU-LCI value
7-5	2-Ethyl-hexanal	123-05-7	**900**	Adoption EU-LCI value
7-6	Octanal	124-13-0	**900**	Adoption EU-LCI value
7-7	Nonanal	124-19-6	**900**	Adoption EU-LCI value
7-8	Decanal	112-31-2	**900**	Adoption EU-LCI value
7-9	2-Butenal (crotonaldehyde, cis-trans-mix)	4170-30-3 123-73-9 15798-64-8	**1**[#]	Individual substance evaluation; Adoption of EU-LCI value is under discussion
7-10	2-Pentenal	1576-87-0 764-39-6 31424-04-1	**12**	Read across from 2-butenal, but no EU classification as mutagen; Adoption of EU-LCI value is under discussion
7-11	2-Hexenal	16635-54-4 6728-26-3 505-57-7 1335-39-3	**14**	Read across from 2-pentenal; Adoption of EU-LCI value is under discussion
7-12	2-Heptenal	2463-63-0 18829-55-5 29381-66-6	**16**	Read across from 2-pentenal; Adoption of EU-LCI value is under discussion
7-13	2-Octenal	2363-89-5	**18**	Read across from 2-pentenal;

	Substance	CAS No.	LCI [µg/m³]	Remarks
		25447-69-2 20664-46-4 2548-87-0		Adoption of EU-LCI value is under discussion
7-14	2-Nonenal	2463-53-8 30551-15-6 18829-56-6 60784-31-8	**20**	Read across from 2-pentenal; Adoption of EU-LCI value is under discussion
7-15	2-Decenal	3913-71-1 2497-25-8 3913-81-3	**22**	Read across from 2-pentenal; Adoption of EU-LCI value is under discussion
7-16	2-Undecenal	2463-77-6 53448-07-0	**24**	Read across from 2-pentenal; Adoption of EU-LCI value is under discussion
7-17*	Furfural	98-01-1	**10**	Adoption EU-LCI value
7-18*	Glutaraldehyde	111-30-8	**1**[#]	Adoption EU-LCI value
7-19	Benzaldehyde	100-52-7	**90**	WEEL (AIHA): 8 800 µg/m³
7-20	Acetaldehyde	75-07-0	**1 200**	VVOC Adoption EU-LCI value
7-21	Propanal*	123-38-6	**750**	VVOC Individual substance evaluation
7-22	Formaldehyde	50-00-0	**100**	VVOC Adoption EU-LCI value
7-23*	Propenal	107-02-8	**14**	VVOC Adoption EU-LCI value
8	**Ketones**			
8-1*	Ethyl methyl ketone	78-93-3	**20000**	Adoption EU-LCI value
8-2	3-Methylbutanone-2	563-80-4	**7000**	Adoption EU-LCI value
8-3*	Methyl isobutyl ketone	108-10-1	**1000**	Adoption EU-LCI value
8-4	Cyclopentanone	120-92-3	**900**	Adoption EU-LCI value
8-5	Cyclohexanone	108-94-1	**410**	Adoption EU-LCI value
8-6	2-Methylcyclopentanone	1120-72-5	**1000**	Read across from cyclopentanone
8-7	2-Methylcyclohexanone	583-60-8	**2300**	Adoption EU-LCI value
8-8	Acetophenone	98-86-2	**490**	Adoption EU-LCI value
8-9*	1-Hydroxyacetone (1-Hydroxy-2-propanone)	116-09-6	**2100**	Read across from propylene glycol
8-10	Acetone	67-64-1	**1200**	VVOC AGW: 1 200 000 µg/m³
9	**Acids**			
9-1*	Acetic acid	64-19-7	**1200**	Adoption EU-LCI value
9-2*	Propionic acid	79-09-4	**1500**	Adoption EU-LCI value
9-3*	Isobutyric acid	79-31-2	**1800**	Adoption EU-LCI value
9-4*	Butyric acid	107-92-6	**1800**	Adoption EU-LCI value
9-5*	Pivalic acid	75-98-9	**2100**	Adoption EU-LCI value
9-6*	n-Valeric acid	109-52-4	**2100**	Adoption EU-LCI value
9-7*	n-Caproic acid	142-62-1	**2100**	Adoption EU-LCI value
9-8*	n-Heptanoic acid	111-14-8	**2100**	Adoption EU-LCI value
9-9*	n-Octanoic acid	124-07-2	**2100**	Adoption EU-LCI value
9-10	2-Ethylhexanoic acid	149-57-5	**150**	Adoption EU-LCI value
10	**Esters and Lactones**			
10-1	Methyl acetate	79-20-9		VVOC

	Substance	CAS No.	LCI [µg/m³]	Remarks
10-2	Ethyl acetate	141-78-6		VVOC
10-3	Vinyl acetate	108-05-4		VVOC
10-4	Isopropyl acetate	108-21-4	**4200**	Adoption EU-LCI value
10-5	Propyl acetate	109-60-4	**4200**	Adoption EU-LCI value
10-6	2-Methoxy-1-methylethyl acetate	108-65-6	**2700**	Adoption EU-LCI value
10-7	n-Butyl formate	592-84-7	**2000**	Read across from methyl formate (AGW: 120 000 µg/m³)
10-8*	Methyl methacrylate	80-62-6	**750**	Adoption EU-LCI value
10-9*	Other methacrylates		**750**	Read across from methyl methacrylate
10-10	Isobutyl acetate	110-19-0	**4800**	Adoption EU-LCI value
10-11	1-Butyl acetate	123-86-4	**4800**	Adoption EU-LCI value
10-12	2-Ethylhexyl acetate	103-09-3	**350**	Read across from 2-ethyl-1-hexanol
10-13	Methyl acrylate	96-33-3	**180**	Adoption EU-LCI value
10-14*	Ethyl acrylate	140-88-5	**200**	Adoption EU-LCI value
10-15	n-Butyl acrylate	141-32-2	**110**	Adoption EU-LCI value
10-16	2-Ethylhexyl acrylate	103-11-7	**380**	Adoption EU-LCI value
10-17	Other acrylates (acrylic acid ester)		**110**	Adoption EU-LCI value
10-18	Dimethyl adipate	627-93-0	**50**	Adoption EU-LCI value
10-19	Dibutyl fumarate	105-75-9	**50**	Adoption EU-LCI value
10-20	Dimethyl succinate	106-65-0	**50**	Adoption EU-LCI value
10-21	Dimethyl glutarate	1119-40-0	**50**	Adoption EU-LCI value
10-22	Hexamethylene diacrylate	13048-33-4	**10**	Adoption EU-LCI value
10-23	Maleic acid dibutylester	105-76-0	**50**	Adoption EU-LCI value
10-24*	Butyrolactone	96-48-0	**2800**	Individual substance evaluation
10-25	Diisobutyl glutarate	71195-64-7	**100**	Individual substance evaluation
10-26	Diisobutyl succinate	925-06-4	**100**	Individual substance evaluation
11	**Chlorinated hydrocarbons**			
	currently not occupied			
12	**Others**			
12-1*	1,4-Dioxane	123-91-1	**400**	Adoption EU-LCI value
12-2	Caprolactam	105-60-2	**300**	Adoption EU-LCI value
12-3*	N-Methyl-2-pyrrolidone	872-50-4	**1800**	Adoption EU-LCI value
12-4	Octamethylcyclotetrasiloxane	556-67-2	**1200**	Adoption EU-LCI value
12-5	Hexamethylenetetramine	100-97-00	**30**	Adoption EU-LCI value
12-6*	2-Butanonoxime	96-29-7	**15**	Adoption EU-LCI value
12-7*	Tributyl phosphate	126-73-8	**300**	SVOC Adoption EU-LCI value
12-8*	Triethyl phosphate	78-40-0	**80**	Individual substance evaluation
12-9	5-Chloro-2-methyl-2H-isothiazol-3-one (CIT)	26172-554	1[#]	Adoption EU-LCI value
12-10	2-Methyl-4-isothiazoline-3-on (MIT)	2682-20-4	**100**	Adoption EU-LCI value
12-11*	Triethylamine	121-44-8	**60**	Adoption EU-LCI value
12-12	Decamethylcyclopentasiloxane (D5)	541-02-6	**1500**	Read across from octamethyl-cyclotetrasiloxane
12-13	Dodecamethylcyclohexasiloxane (D6)	540-97-6	**1200**	Read across from octamethyl-cyclotetrasiloxane
12-14	Tetrahydrofuran	109-99-9	**1500**	AGW: 150 000 µg/m³
12-15	Dimethylformamide	68-12-2	**15**	AGW: 15 000 µg/m³
12-16	Tetradecamethylcycloheptasiloxane (D7)	107-50-6	**1200**	Read across from octamethyl-cyclotetrasiloxane
12-17*	N-Ethyl-2-pyrrolidone	2687-91-4	**400**	Adoption EU-LCI value

	Substance	CAS No.	LCI [µg/m³]	Remarks
12-18*	N-Butyl-2-pyrrolidone	3470-98-2	**500**	Individual substance evaluation

*: new or altered in 2018

#: An evaluation within the framework of the LCI-concept will take place only at and above a measured concentration of 5 µg/m³.

VVOC very volatile organic compounds

SVOC semi volatile organic compounds

1) In order to maintain compatibility with the ADAM template, assigned numbers in the LCI list cannot be reassigned when a substance or a group of substances has been deleted or moved to another place.

Additional remarks:

I) Links to current lists of carcinogenic substances (EU category 1):

The links below lead to lists of substances which are classified as Category 1A or 1B carcinogens under EU Regulation 1272/2008 and have to be evaluated under the AgBB scheme (please make sure lists are up to date):

- Institute for Occupational Safety and Health of the German Social Accident Insurance
  http://www.dguv.de/ifa/fachinfos/kmr-liste/index.jsp
- ECHA, European Chemicals Agency
  http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database

II) Data treatment

A software tool (ADAM, AgBB-DIBt-Auswerte-Maske) has been developed for the collection and storage of emissions data and the calculation of the test result. This software can be obtained from the DIBt (contact DIBt, Kolonnenstr. 30B, 10829 Berlin, phone +49(0)30 78730-353, fax +49(0)30 78730-11353).

III) Analysis of aldehydes

The carboryl compounds formaldehyde, acetaldehyde, propanal, propenal, butanal and acetone shall be determined using the method described in ISO 16000-3 that is in accordance with the specifications of the EN 16516.

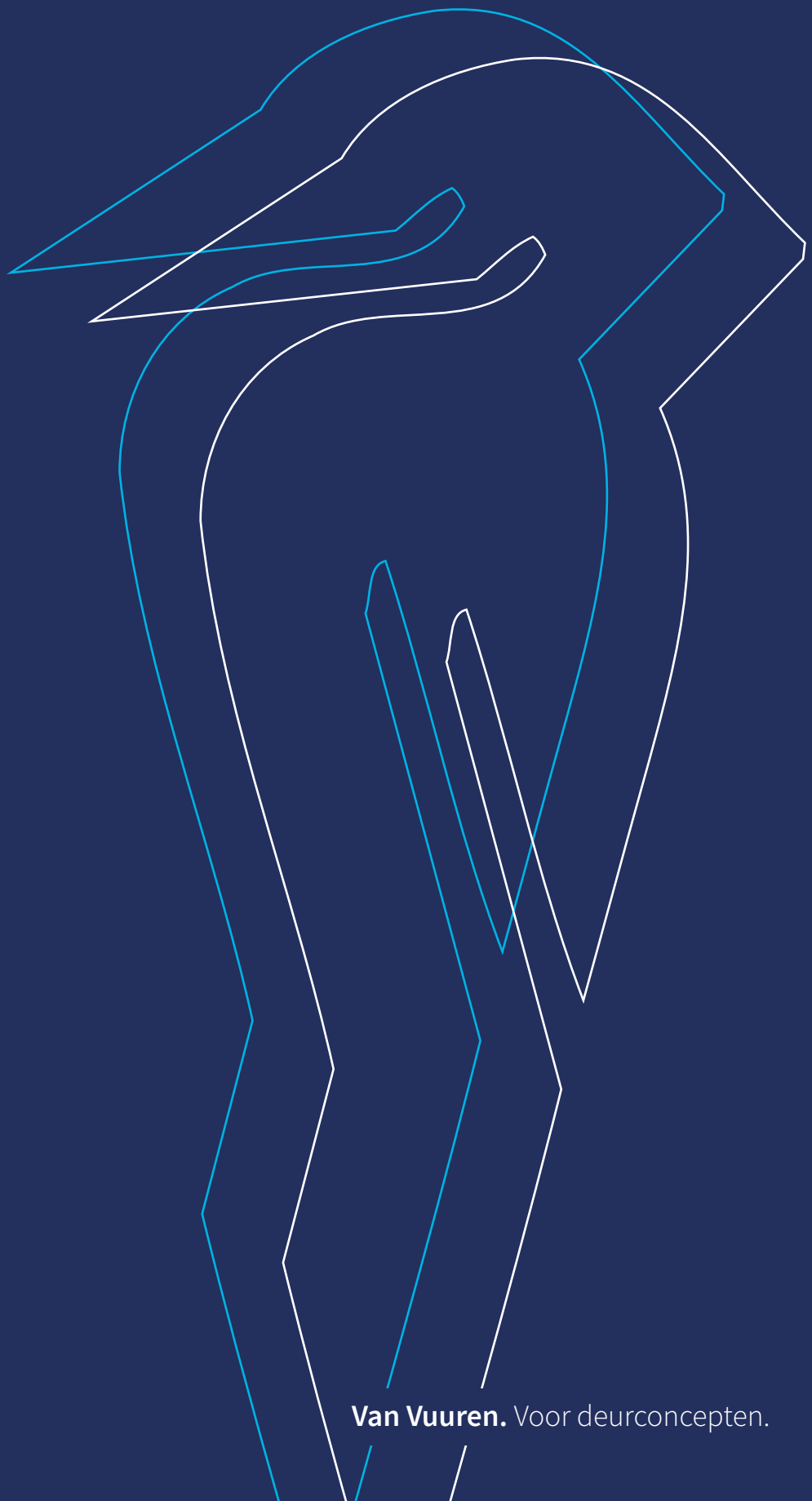
IV) Analysis of VVOC

Determination of the VVOC formaldehyde, acetaldehyde, propanal, propenal and acetone shall be done using the method described in the ISO 16000-3. For the other VVOCs listed in the LCI list, a suitable test method in accordance with the current state of standardisation shall be used and reported (see also EN 16516, Annex C).

V) Analysis of saturated aliphatic hydrocarbons (LCI 2-9 and LCI 2-10)

Subdividing this group of compounds is necessary because of their different LCI. It is based on the appearance of an "alkane hump" in the gas chromatogram at the retention time of n-nonane, i.e. an LCI of 14000 µg/m³ applies to aliphatic hydrocarbons with a retention time shorter than that of n-nonane and an LCI of 6000 µg/m³ to aliphatic hydrocarbons with a retention time equal to or exceeding that of n-nonane.

The allocation of individual peaks of saturated aliphatic hydrocarbons which cannot be identified exactly shall also be based on the retention time of n-nonane.



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