BELAC 633-TEST

Emission test report of Orac NV sample “Duro Polymer”

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SPT2022-R147

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Normec Product Testing is part of the Normec Group. The company focusses on product emission testing and VOC reduction performance testing. The product emission tests analyse the impact of all kinds of building and consumer products and materials on indoor air quality.

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1. OVERVIEW OF THE RESULTS

In the table below is shown to which legislations and/or labels the product complies:

Regulation or protocol	Result
French VOC regulations	
Italian regulation (public procurement)	√
Belgian regulation	√
German AgBB (2018)/ABG (2021)	√
Polish legislation	X
LEED v4.1 (outside U.S.): VOC emissions requirements	√
BREEAM International: VOC emissions requirements	√

X : not compliant
√ : compliant

According to the decision rule defined in the contract, for the above statements of conformity the measurement uncertainty was not taken into account.

2. OBJECTIVE/EVALUATION FRAMEWORK

Determination of the volatile organic compound emissions according to the legislations and/or labels listed in the table below:

French VOC regulations	Arrêté du 28 mai 2009 modifiant l'arrêté du 30 avril 2009, Arrêté du 20 février 2012 modifiant l'arrêté du 19 avril 2011, Décret no 2011-321 du 23 mars 2011)
Italian regulation (public procurement)	Italian Decree on Green Public Procurement issued in January 2016 (21-1-2016 GAZZETTA UFFICIALE DELLA REPUBBLICA ITALIANA Serie generale - n. 16)
Belgian regulation	Royal Decree: 8 MEI 2014 - Koninklijk besluit tot vaststelling van de drempelniveaus voor de emissies naar het binnenmilieu van bouwproducten voor bepaalde beoogde gebruiken
German AgBB (2018)/ABG (2021)	2019/306/D: Model Administrative Rules on Technical Building Regulations [MVV TB] - Version 2019/1 Annex 8: requirements for construction works with regard to Health protection = Anforderungen an bauliche Anlagen bezüglich des Gesundheitsschutzes (ABG) Recent Version (Muster-Verwaltungsvorschrift Technische Baubestimmungen (MVV TB) – Ausgabe 2021/1 - Version 17-01-2022
Polish legislation	Monitor Polska NR 19/1996, pos. 231. ORDINANCE OF THE MINISTER OF HEALTH AND SOCIAL WELFARE of 12 March 1996 on the permitted concentrations and intensities of agents harmful for health emitted by construction materials, facilities and components of furniture in rooms intended for human residence
LEED v4.1 (outside U.S.): VOC emissions requirements	LEED v4.1 Building design and construction 22 January 2019 / LEED v4.1 section Low-Emitting Materials - Indoor Environmental Quality
BREEAM International: VOC emissions requirements	BREEAM International New Construction 2016 manual and GN22: BREEAM Recognised Schemes for Emissions from Building Products V2.5 September 2018 & BREEAM International New Construction 2016 (Hea 02 Table 17: Emission criteria by product type / Table 18: Exemplary level emission criteria by product type)

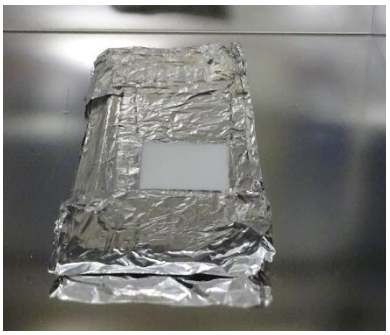
3. SAMPLE INFORMATION

Table 1: Sample information provided by client

Sample identification	Duro Polymer
Date of production	06/04/2022
Date of sampling	14/04/2022
Batch N°	06042022
Type of product	Skirting
Article nr.	SX118
Misc.	

Table 2: Sample information provided by Normec Product Testing

Sample group code	**SPT2022168**
Sample code	SPT20221637
Date of reception of the sample	25/04/2022
Preconditioning period (start – end)	No Preconditioning
Date of the test (start – end)	29/04/2022 – 27/05/2022



Photograph 1: test sample Duro Polymer

4. TEST METHODS - ACCREDITATION

The following test methods were used:

- Test chamber was operated according to NBN EN 16516:2017+A1:2020 (ISO 16000-9 with extra clauses): Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air (internal procedure QM001)
- Analysis of TENAX samples was performed according to NBN EN 16516:2017+A1:2020 (ISO 16000-6 with extra clauses): Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air (internal procedure QM002)
- Analysis of DNPH cartridges was performed according to NBN EN 16516:2017+A1:2020 (ISO 16000-3): Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air (internal procedure QM003)
- The test sample preparation was performed according to NBN EN 16516:2017+A1:2020 (ISO 16000-11 with extra clauses): Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air (internal procedure QM001)

Table 3: Overview of the test method parameters

EN 16516 method	
Analytical methods	**analytes**
ISO 16000-3	Volatile aldehydes (C1-C4)
ISO 16000-6 + extra clauses	VOC, SVOC
Test chamber parameters	**values**
Chamber volume (m^3)	0.110
Air exchange rate (h^{-1})	0.5
Temperature (°C)	23 ± 1
Relative humidity (%)	50 ± 5
Loading factor (m^2/m^3)	0.05
Sample preparation	
Dimensions (m^2)	0.07 x 0.07
Application amount (g)	-

Normec Product Testing is an accredited laboratory according to EN ISO/IEC 17025 (BELAC 633-TEST) for the internal procedures QM001, QM002 and QM003. At present the accreditation does not cover the compounds marked with *, however analysis for these compounds was performed at the same level of quality as for the accredited compounds. The analytical measurement uncertainty (expanded uncertainty) for volatile aldehydes amounts to maximum 15 % and 30 % for the other target compounds. The total measurement uncertainty amounts to maximum 30 % for all compounds

5. RESULTS

5.1. VOC EMISSION RESULTS AFTER 3 DAYS

VOC analysis after 3 days						
	CAS number	RT	Id[1]	Conc. ($\mu g/m^3$)	SER_a ($\mu g/m^2h$)	R_i
VOC with LCI[2]						
Toluene	108-88-3	12.8	1	< 5		
Ethylbenzene	100-41-4	15.7	1	< 5		
Styrene	100-42-5	16.5	1	49	490	0.196
VOC without LCI (non-assessable)						
-	-	-	-	-	-	-
Non identified						
-	-	-	-	-	-	-
Sum of VOCs without LCI						
TVOC G (AgBB)				49	490	
R value G						0.196
Carcinogens				< 1		
Benzene				< 1		
D.L.: detection limit < 0.5 $\mu g/m^3$ Q.L. VOC:quantification limit < 1 $\mu g/m^3$						

[1] Identification:
- 1: identification by standard solution and retention time, confirmed by spectrum library and specifically calibrated
- 2: identification by comparison with spectrum library and plausibility declaration, calibrated as toluene equivalent
- 3: not identified, calibrated as toluene equivalent

[2] Compounds marked with an * are not part of the accreditation

5.2. VOC EMISSION RESULTS AFTER 28 DAYS

VOC analysis after 28 days						
	CAS number	RT	Id[3]	Conc. (µg/m³)	SER_a (µg/m²h)	R_i
VOC with LCI[4]						
Toluene	108-88-3	12.8	1	< 5		
Ethylbenzene	100-41-4	15.7	1	< 5		
Styrene	100-42-5	16.5	1	33	330	0.133
VVOC with LCI						
Formaldehyde	50-00-0	2.2	1	<1		
Acetaldehyde	75-07-0	3.0	1	<1		
Acetone	67-64-1	4.0	1	<1		
Propionaldehyde	123-38-6	4.9	1	<1		
Butyraldehyde	123-72-8	7.7	1	<1		
VOC without LCI (non-assessable)						
-	-	-	-	-	-	-
Non identified						
-	-	-	-	-	-	-
Sum of VOCs without LCI				< 5		
TVOC B				45	450	
TVOC Fr				55	550	
TVOC G (AgBB)				33	330	
TSVOC				< 5		
-	-	-	-	-	-	-
R value B						0.133
R value G						0.133
Carcinogens				<1		
Benzene				<1		
D.L.: detection limit < 0.5 µg/m³ Q.L.: quantification limit < 1 µg/m³						

[3] Identification:
- 1: identification by standard solution and retention time, confirmed by spectrum library and specifically calibrated
- 2: identification by comparison with spectrum library and plausibility declaration, calibrated as toluene equivalent
- 3: not identified, calibrated as toluene equivalent

[4] Compounds marked with an * are not part of the accreditation

6. EVALUATION OF THE RESULTS

6.1. COMPARISON WITH LIMIT VALUES OF FRENCH LEGISLATION

Compound[5]	CAS number	id[6]	Conc. (µg/m³)	Classification Fr	Criteria C (µg/m³)	Criteria B (µg/m³)	Criteria A (µg/m³)	Criteria A⁺ (µg/m³)
Formaldehyde	50-00-0	1	<1	A⁺	>120	<120	<60	<10
Acetaldehyde	75-07-0	1	<1	A⁺	>400	<400	<300	<200
Toluene	108-88-3	1	1	A⁺	>600	<600	<450	<300
Tetrachloroethylene	127-18-4	1	<1	A⁺	>500	<500	<350	<250
Ethylbenzene	100-41-4	1	1	A⁺	>1500	<1500	<1000	<750
Xylene	1330-20-7	1	<1	A⁺	>400	<400	<300	<200
Styrene	100-42-5	1	33	A⁺	>500	<500	<350	<250
2-Butoxyethanol	111-76-2	1	<1	A⁺	>2000	<2000	<1500	<1000
1,2,4-Trimethylbenzene	95-63-6	1	<1	A⁺	>2000	<2000	<1500	<1000
1,4-Dichlorobenzene	106-46-7	1	<1	A⁺	>120	<120	<90	<60
Trichloroethylene	79-01-6	1	<1	A⁺				
Benzene	71-43-2	1	<1	A⁺				
Bis(2-ethylhexyl) phthalate*	117-81-7	1	<1	A⁺				
Dibutyl phthalate*	84-74-2	1	<1	A⁺				
TVOC		2	55	A⁺	>2000	<2000	<1500	<1000

No CMR compounds detected

[5] Compounds marked with an * are not part of the accreditation

[6] Identification/quantification:

- 1: identification by standard solution and retention time, confirmed by spectrum library and specifically calibrated
- 2: identification by comparison with spectrum library and plausibility declaration, calibrated as toluene equivalent
- 3: not identified, calibrated as toluene equivalent

6.2. COMPARISON WITH LIMIT VALUES OF ITALIAN LEGISLATION

Compound[7]	CAS number	Id[8]	Concentration (µg/m³)	Classification It
Formaldehyde	50-00-0	1	<1	(<60): √
Acetaldehyde	75-07-0	1	<1	(<300): √
Toluene	108-88-3	1	1	(<450): √
Tetrachloroethylene	127-18-4	1	<1	(<350): √
Ethylbenzene	100-41-4	1	1	(<1000): √
Xylene	1330-20-7	1	<1	(<300): √
Styrene	100-42-5	1	33	(<350): √
2-Butoxyethanol	111-76-2	1	<1	(<1500): √
1,2,4-Trimethylbenzene	95-63-6	1	<1	(<1500): √
1,4-Dichlorobenzene	106-46-7	1	<1	(<90): √
Trichloroethylene	79-01-6	1	<1	(<1): √
Benzene	71-43-2	1	<1	(<1): √
Bis(2-ethylhexyl)phthalate*	117-81-7	1	<1	(<1): √
Dibutyl phthalate*	84-74-2	1	<1	(<1): √
TVOC		2	55	(<1500): √

6.3. COMPARISON WITH LIMIT VALUES OF BELGIAN LEGISLATION

Belgian Parameter	Concentration (µg/m³)	Threshold level after 28 days (µg/m³)
R –value (dimensionless)	0.1	≤ 1
TVOC	45	≤ 1000
TSVOC	< 5	≤ 100
Carcinogenic substances category 1A and 1B, as referred to in Article 36(1)(c) of Regulation (EC) No. 1272/2008 of the European Parliament and the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures.	< 1	≤ 1
Acetaldehyde (EINECS 200-836-8; CAS 75-07-0)	< 1	≤ 200
Toluene (EINECS 203-625-9; CAS 108-88-3)	1	≤ 300
Formaldehyde (EINECS 200-001-8; CAS 50-00-0)	< 1	≤ 100

[7] Compounds marked with an * are not part of the accreditation

[8] Identification:

- 1: identification by standard solution and retention time, confirmed by spectrum library and specifically calibrated
- 2: identification by comparison with spectrum library and plausibility declaration, calibrated as toluene equivalent
- 3: not identified, calibrated as toluene equivalent

6.4. COMPARISON WITH LIMIT VALUES OF GERMAN AGBB (2018)/ABG (2021) LEGISLATION

Parameter	Test after 3 days		Test after 28 days	
	Concentration (mg/m^3)	Limit value (mg/m^3)	Concentration (mg/m^3)	Limit value (mg/m^3)
R –value (dimensionless)		-	0.1	≤ 1
TVOC	0.05	≤ 10	0.03	≤ 1.0
TSVOC		-	< 0.005	≤ 0.1
Total carcinogens	< 0.001	≤ 0.010	< 0.001	≤ 0.001
TVOC without LCI		-	< 0.005	≤ 0.1
Formaldehyde		-	< 0.001	≤ 0.12

6.5. COMPARISON WITH LIMIT VALUES OF POLISH LEGISLATION

Name of organic compound	Concentration ($\mu g/m^3$)	Required value, $\mu g/m^3$ for	
		A category premises	B category premises
Styrene	33	20	30

6.6. COMPARISON WITH EMISSION CRITERIA OF LEED V4.1 (EUROPE)

Projects outside the U.S. may use products tested and deemed compliant in accordance with either (1) the CDPH standard method (2010) or (2) the German AgBB Testing and Evaluation Scheme (2010). Test products either with (1) the CDPH Standard Method (2010), (2) the German AgBB Testing and Evaluation Scheme (2010), (3) ISO 16000-3: 2010, ISO 16000-6: 2011, ISO 16000-9: 2006, ISO 16000-11:2006 either in conjunction with AgBB, or with French legislation on VOC emission class labeling, or (4) the DIBt testing method (2010).

See detailed emission results in sections 6.1 and 6.4 (AgBB and French formaldehyde results).

6.7. COMPARISON WITH EMISSION CRITERIA OF BREEAM INTERNATIONAL

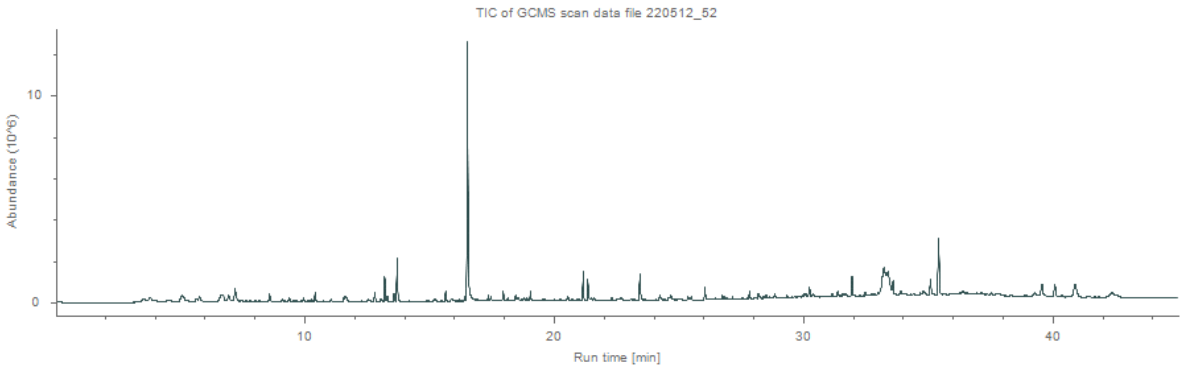
	28 days acceptance		28 days exemplary	
	Concentration (mg/m^3)	Limit value (mg/m^3)	Concentration (mg/m^3)	Limit value (mg/m^3)
Formaldehyde	< 0.001	≤ 0.06	< 0.001	≤ 0.01
TVOC	0.05	≤ 1	0.05	≤ 0.3
TSVOC		-	< 0.005	≤ 0.1
Carcinogens 1A and 1B	< 0.001	≤ 0.001	< 0.001	≤ 0.001

7. APPLIED LCI/NIK VALUES

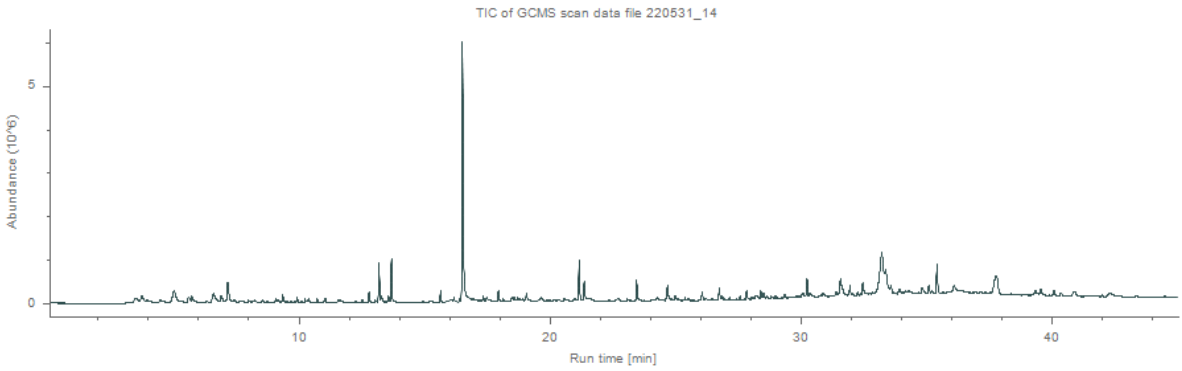
Compound	CAS number	EU-LCI ($\mu g/m^3$)	ABG NIK 2021 ($\mu g/m^3$)
Styrene	100-42-5	250	250

8. CHROMATOGRAMS

3 days



28 days



9. AUTHORISATION OF REPORT

This report contains the results of samples, analysed within the scope of a study ordered by Orac NV (Biekorfstraat 32; 8400 Oostende, Belgium). It relates to the sample(s) with the following Normec Product Testing - identification:

Sample monster codes belonging to sample group SPT2022168	
From	To
SPT20221637	SPT20221637

Normec Product Testing is an accredited laboratory according to EN ISO/IEC 17025 (BELAC 633-TEST) for the internal procedures QM001, QM002 and QM003.

The laboratory is not responsible for the accuracy of the information provided by the customer (see Table 1). The analytical results in this research report only relate to the samples analysed. Interpretations, advice and other not merely objective information are not covered by the EN ISO/IEC 17025 accreditation. Further information on measurement uncertainty and sample preservation will be provided upon request.

Dates of analysis:

- DNPH: 09/06/2022
- Tenax: 12/05/2022 & 31/05/2022

This research report consists of 15 numbered pages, and the signature below confirms the authorisation of the analytical results according to EN ISO/IEC 17025.

M. Lor
Managing Director Normec Product Testing

servaco product testing

Normec Product Testing

Sampling report

Testing laboratory / certification body: Normec Product Testing Honderdweg 13 9230 Wetteren Belgium	Sampler (name, company, telephone): ORAC NV 0032 59 80 3252
Name of the manufacturer at the place of sampling (address/stamp): ORAC NV BIEMORFSTRAAT 32 8400 OOSTENDE BELGIUM	Manufacturer (if deviating from company's name at the place of sampling): ORAC NV
Name of the product: DURO POLYMER	Type of product (e.g.GEV product group, laminate, textile flooring, PVC- flooring): SKIRTING
Model/program/series: SX118	Batch No: 06042022
Article No: Misc.: SX118	Date of batch production: 06042022

Sample is taken from Warehouse	☒ Production ☒ Store ☐ Miscellaneous	How had the product been stored prior to sampling?	☐ Open ☑ In the stack ☐ Wrapped up
	Place of storage: Belgium Warehouse.		Packing material:

Specifics (possible negative influences by emission at the place of taking the sample, petrol emissions, solvent emissions from production, uncertainties, questions, etc.):

No special emission of solvent.
Painted with waterbase paint

Cut edges (identification of cut edges when present and identification of new surfaces and surface to be exposed in the emission test):

cut with saw

Confirmation

The signer herewith confirms the correctness of the data given above. The sample was selected, drawn and packed personally in accordance with the instructions for the taking of samples.

Date of sampling: 14. 4. 2022	Signature: (Stamp)