REPORT

Contract no.:	DLR 500038/2021 - HC	11.10.2021 HAE/MEJ
Customer:	Pfeifer Timber GmbH Mühlenstraße 7 86556 Kühbach Deutschland	
Subject:	Formaldehyde emission testing of one sample in accordance with EN 717-1	
Date of contract:	22.06.2021	
Date of sample delivery:	20.09.2021	
Date/Period of service:	20.09.-06.10.2021	
Period of validity:	---	
Pages:	6	
Enclosures:	Results evaluation of the sample (German)	

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1. Contract

On June the 6th 2021 Holzforschung Austria was commissioned with the testing of one CLT sample regarding its formaldehyde emission according to EN 717-1.

Contact person: Mr. Bernd Gusinde

2. Applied standards and guidelines

EN 717-1 (2005): Wood-based panels – Determination of formaldehyde release – Part 1: Formaldehyde emission by the chamber method

Verordnung des Bundesministers für Umwelt, Jugend und Familie vom 12. Februar 1990 über Beschränkungen des Inverkehrsetzens und über die Kennzeichnung formaldehydhaltiger Stoffe, Zubereitungen und Fertigwaren (Formaldehydverordnung) StF: BGBl. Nr. 194/1990 (Austrian Formaldehyde Regulation)

German Federal Gazette (deutscher Bundesanzeiger), published by the German Federal Ministry of Justice and Consumer Protection, announcement of November the 26th 2018 (Banz AT 26.11.2018 B2)

German Prohibition of Chemicals Ordinance (deutsche Chemikalien-Verbotsverordnung, ChemVerbotsV) of January the 20th, 2017
(BGBl. I S. 94; 2018 I S. 1389)

3. Sample specification

On September the 20th 2021 four pieces of the sample, with the dimensions of 450 x 450 x 180 mm each, were delivered to Holzforschung Austria (see table 1). The specimens were packed airtight.

Table 1: Sample specification

HFA sample name	Sample label customer	Sample type	Batch no. customer	Production date
500038_21	Pfeifer CLT Brettsperrholz 180 mm 7s DL	180 7s DL IQ-IQ	AU 01125-61	01.09.2021

4. Test method

Testing was done in one of the 1 m³ emissions chambers of Holzforschung Austria.

To achieve a loading factor of 1 m² emitting surface /m³ chamber volume 2 specimens of the sample were used in the dimensions they were received in and one specimen had to be cut to the right size. The edges were sealed with self-adhesive aluminium tape according to EN 717-1 before the sample was placed in the emission chamber (see figure 1).

Figure 1: The sample 500038_21 in the 1 m³ emission chamber

4.1. Emission chamber testing parameters

Table 2: Emission chamber testing parameters

Parameter	Value	Unit	Tolerance
Temperature	23	°C	± 0.5
Relative humidity	45	%	± 3
Air exchange rate	1	m³/h	± 0.05
Loading factor	1	m²/m³	± 0.02
Area specific air flow rate	1	m³/m²h	
Chamber volume	1	m³	

Temperature and relative humidity were recorded continuously during the entire testing period.

4.2. Analysis of formaldehyde emissions

For sampling a defined volume of emission chamber air is drawn through two gas washing bottles, which are connected in series and filled with deionised water. The analysis of formaldehyde is then performed using the Hantzsch reaction where formaldehyde and acetylacetone reagent form a yellow coloured complex. The concentration of this complex is detected photometrically at 412 nm.

Sampling took place twice a day, whereas a minimum duration of 3 hours was maintained between two measurements.

Expanded measurement uncertainty of the analytical method: 12 %.

4.3. Determination of the steady state emission value

EN 717-1 states the following possible results for determination of the steady state emission value:

Abort criteria for day 4:
If the linear regression function of the measurement values of the first 4 successive days does not increase more than 2 µg/m³ and if no single test result exceeds the threshold value, testing may be stopped.
The steady state value for the formaldehyde emission cannot be calculated with this measurement. The result is the mean value of the two samplings of day 4 (limit is met).

Abort criteria for day 10:
For calculation of the steady state emission value the minimum duration of the chamber test is fixed to 10 days (minimum 7 sampling days). The steady state is reached, when the decline of the calculated concentration curve is ≤ 5% over a testing time of 4 days.
The steady state value is then the mean value of the two results of the last measurement day.

If the abort condition is not reached within 10 days, the test is continued until the steady state is reached or until day 28. If the steady state is still not reached on day 28, the value calculated by a power function for the day 28 is defined as the steady state emission value.

5. Results

Table 3 shows the results of the formaldehyde emission testing of the received sample according to ÖNORM EN 717-1.

Table 3: Results of the formaldehyde emission testing

HFA sample name	Abort criteria for day 4 met	Abort conc.		Steady state reached	Testing stopped after		Steady state value.	
		[mg/m³]	[ppm]		[h]	[d]	[mg/m³]	[ppm]
500038_21	---	---	---	yes	246	10	0.01	0.01

6. Result interpretation

With a steady state value of 0.01 mg/m³ (0.01 ppm) the sample complies with the limit set in the Austrian formaldehyde regulation (StF: BGBl. Nr. 194/1990) of 0.124 mg/m³ (0.1 ppm) for the formaldehyde class E1.

The German Prohibition of Chemicals Ordinance (ChemVerbotsV BGBl I S.94) specifies in attachment 1 (to §3) the limits for the formaldehyde emission class E1 for laminated and not laminated wood-based materials with 0.124 mg/m³ or 0.1 ppm formaldehyde. In the announcement of the German Federal Gazette published on November the 26th 2018 (Banz AT 26.11.2018 B2) the testing conditions for this classification are defined. It is stated in this document that results of testing in accordance with EN 717-1 have to be multiplied with the factor 2 before compliance with the limits can be determined.

With the steady state value according to EN 717-1 (multiplied with the factor 2) of 0.02 mg/m³ (0.02 ppm) the sample complies with the limits set for the German E1 class.

7. Storage of samples

Samples will be kept in storage for a period of 3 months after completion of the measurements.

HOLZFORSCHUNG AUSTRIA

DI (FH) Christina Fürhapper
Authorised signatory

Mag. Elisabeth Habla
Technical consultant

This document was approved electronically in accordance with an internal HFA process by the designated authorized signatory, traceable and documented.

Accreditation is given for the following procedures.
It is not allowed to use included accreditation marks for own purposes.

accreditation mark	type of accreditation	procedure/s
Akkreditierung Austria 0055 ISO/IEC 17025 T	testing	• ÖNORM EN 717-1

The results and statements given in this document relate only to the tested materials as received, the present information and the state of the art at the time of investigation.

The conformity assessment of the results is subject to the shared-risk approach.

Enclosure

to Contract no. DLR 500038/2021 - HC

HFA eSi-Formular001

EN 717-1 Ausgleichskonzentration

Auftragsnummer		500038/21
Probebezeichnung		
Abbruch nach 4 Tagen		nein
	Kriterien erfüllt	nein
Ausgleichskonzentration (AK)	[mg/m³]	0,01
	[ppm]	0,01
Erweiterte Messunsicherheit	[%]	12%
E1 Grenzwert (ISO 13986)	[mg/m³]	0,124
Ermittelte Zeit bis zum Erreichen der AK	[h]	672
	[d]	28
Prüfbedingungen	T [°C]	23,0
	RH%	45,0
	PK-Volumen [m³]	1,0
	Beladung [m²/m³]	1,0
	Luftwechselrate	1,0
	Kanten versiegelt	normgemäß
Prüfdauer (bis zur Bestimmung des Wertes der Ausgleichskonzentration)	[h]	246
	[d]	10
	Datum Begin	20.09.2021
	Datum Ende	30.09.2021
	Anz. PN (+BW)	15
Parameter der Potenzfunktion $c=A/(1+Bt^{D})$	A	2,868E+01
	B	2,194E+02
	D	5,122E-01
	PN Start [d]	1
	PN Ende [d]	14
Formular- und Inhalts- Version	4,01	334

Bearbeiter	Aktion	Datum	Hashes		
Elisabeth Habla	Signatur	06.10.2021	IcdsBmP		
Elisabeth Habla	Abschließen	06.10.2021	IcdsBmP		

Anmerkung

HCHO Konzentrationsverlauf					
Probenahme	Datum	Zeit [h]	Formaldehyd - Konzentration		
			Analyse		Modell
			[ppm]	[mg/m³]	[mg/m³]
1	21.09.2021 05:45	30	0,020	0,025	0,023
2	21.09.2021 13:19	37	0,016	0,019	0,020
3	22.09.2021 05:45	54	0,012	0,015	0,017
4	22.09.2021 13:24	61	0,012	0,015	0,016
5	23.09.2021 05:45	78	0,013	0,016	0,014
6	24.09.2021 05:45	102	0,008	0,010	0,012
7	24.09.2021 10:10	106	0,008	0,011	0,012
8	27.09.2021 06:52	175	0,007	0,009	0,009
9	27.09.2021 13:31	182	0,009	0,012	0,009
10	28.09.2021 05:45	198	0,008	0,010	0,009
11	28.09.2021 13:30	206	0,007	0,009	0,009
12	29.09.2021 05:45	222	0,008	0,009	0,008
13	29.09.2021 13:14	229	0,006	0,007	0,008
14	30.09.2021 05:45	246	0,007	0,009	0,008
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