

Northwood - Severny Plywood Mill
Mr. Galinov Ilija
Proezd Yareslav Hasheka 1.
Petropavlovsk city
Kazakhstan

E-Mail: ilya@northwood.ru

Bru/50
Dresden, 04 November 2022

Test Report 2122074/2022/E1-2020/I1

Client: Northwood - Severny Plywood Mill
Proezd Yareslav Hasheka 1.
Petropavlovsk city
Kazakhstan

Order: Testing of **unfaced birch plywood** in the thickness range 9 - 24 mm regarding:

- (A) Formaldehyde release according to the test chamber method EN 717-1
Formaldehyde release according to the gas analysis method EN ISO 12460-3
- (B) Correlation analysis regarding the German Prohibition of Chemicals Ordinance (PCO)

Contractor: Entwicklungs- und Prüflabor Holztechnologie GmbH (EPH)
Laboratory Chemical Testing
Zellescher Weg 24
D-01217 Dresden

Engineer in charge: Dipl.-Ing. (FH) S. Hahn



Dipl.-Ing. Martina Broege
Head of Laboratory Chemical Testing

The test report contains 6 pages inclusive 1 annex with 1 page. Any duplication of extracts requires the written permission of EPH. The test results refer exclusively to the material tested.

1 Task

(A) The Northwood - Severny Plywood Mill has assigned EPH Laboratory Chemical Testing to determine the Formaldehyde release of PF-glued birch plywood according to the test chamber method EN 717-1 and gas analysis method EN ISO 12460-3.

(B) Product-specific manufacturer correlations should be used in order to evaluate the wood-based material within the framework of the factory production control (FPC). The methods of factory production control are not specified. A wide variety of testing procedures can therefore be applied, provided an adequate correlation to the chamber method has been demonstrated and a product-specific limit value (shipping quality control limit = SQCL) calculated.

The Northwood - Severny Plywood Mill has assigned EPH Laboratory Chemical Testing to establish a product-specific correlation with calculated SQCL of plywood between test chamber method EN 717-1 and method of FPC - gas analysis test method according to EN ISO 12460-3.

2 Sample material

Sample delivery: 21 September 2022, airtight wrapped

Product No.:	Product 1					
EPH-Identity-no.:	DF-PW-1-I-1 /1...3- 22-09-07	DF-PW-1-I-2 /1...3- 22-09-07	DF-PW-1-I-3 /1...3- 22-09-07	DF-PW-1-I-4 /1...3- 22-09-07 (Reserve set)	DF-PW-1-I-5 /1...3- 22-09-07	DF-PW-1-I-6 /1...3- 22-09-07
Product type:	Plywood, phenol formaldehyde-glued (PF)					
Product name:	Birch Plywood					
Thickness range:	9 – 24 mm					
Production date:	2022-09-07	2022-09-07	2022-09-07	2022-09-07	2022-09-07	2022-09-07
Batch/Lot no.:	2231194	2231194	2231194	2231194	2231194	2231194
Panel thickness:	9 mm	9 mm	15 mm	15 mm	21 mm	21 mm
Dimension of panel [mm]:	2500 x 1250	2500 x 1250	2500 x 1250	2500 x 1250	2500 x 1250	2500 x 1250
Dimension samples [mm]:	450 x 450	450 x 450	450 x 450	450 x 450	450 x 450	450 x 450

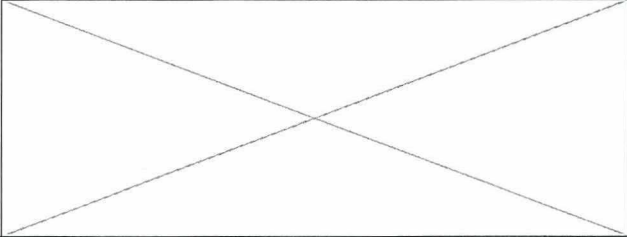
The test material was used up respectively is stored for 3 months.

3 Test performance

3.1 Test parameters EN 717-1

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

Test conditions:

Sample 1 - 9 mm		Sample 5 - 21 mm	
Test pieces	2 PK à 200 x 280 [mm]	Test pieces	2 PK à 200 x 280 [mm]
Test chamber:	KT-39 (0.225 m ³)	Test chamber:	KT-59 (0.225 m ³)
Test period:	29/09/2022 - 07/10/2022	Test period:	11/10/2022 -
Start tests:	30/09/2022	Start tests:	12/10/2022 - 03/11/2022
Edge sealing:	Ratio = 1.5	Edge sealing:	Ratio = 1.5
Sample 2 - 9 mm		Sample 6 - 21 mm	
Test pieces	2 PK à 200 x 280 [mm]	Test pieces	2 PK à 200 x 280 [mm]
Test chamber:	KT-114 (0.225 m ³)	Test chamber:	KT-112 (0.225 m ³)
Test period:	04/10/2022 - 17/10/2022	Test period:	11/10/2022 - 25/10/2022
Start tests:	05/10/2022	Start tests:	12/10/2022
Edge sealing:	Ratio = 1.5	Edge sealing:	Ratio = 1.5
Sample 3 - 15 mm			
Test pieces	2 PK à 200 x 280 [mm]		
Test chamber:	KT-58 (0.225 m ³)		
Test period:	04/10/2022 - 11/10/2022		
Start tests:	05/10/2022		
Edge sealing:	Ratio = 1.5		
Temperature (T):		23°C ± 0.5 K	
Rel. air humidity (RH):		45 ± 3 %	
Air exchange ratio:		1.0 ± 0.05/ h	
Loading ratio:		1.0 ± 0.02 m ² /m ³	
Parameter recording:		T; RH	

TP...Test pieces

Limit of Detection (LOD) of test method: 0.008 ppm HCHO (1 ppm = 1.24 mg/m³)

3.2 Gas analysis method EN ISO 12460-3

Method: EN ISO 12460-3:2021-02; Wood-based panels – Determination of formaldehyde release – Part 3: Gas analysis method

Test period: 04 – 18 October 2022
 Size of test pieces: 402 x 52 mm
 Edge sealing: full with about 1 mm overlap
 Unsealed area resulted: 0.04 m²
 Conditioning: according test standard (point 7.1)

Limit of detection (LOD) test method: 0.1 mg HCHO/m²

4 QCL calculation

Options for QCL calculation¹:

	OPTION	Test method FPC	Correlation developed by
<input type="checkbox"/>	A	/	straightforward calculation of the correlation based on the actual set of data-pairs
<input checked="" type="checkbox"/>	B	ISO 12460-3 (Shipping QCL)	QCL established as two-point correlation using average value and a measured point near the origin
<input type="checkbox"/>	C	/	QCL established as a "do not exceed" threshold given by the average of the clustered data pairs
<input type="checkbox"/>	D	/	correlation based on the actual set of data-pairs and using a point measured near the origin

5 Test results EN 717-1 and Evaluation²

5.1 Test results gas analysis method EN ISO 12460-3

Sample	Test date	Gas analysis values [mg HCHO /m ² h]					
		Single values				Average value (1/2 h – 4 h)	
		1h	2h	3h	4h		
1 – 9 mm	04/10/2022	0.22	0.20	0.16	0.11	0.2	0.2
	06/10/2022	0.28	0.21	0.15	<LOD	0.2	
2 – 9 mm	10/10/2022	0.24	0.21	0.14	0.13	0.2	0.2
	11/10/2022	0.26	0.14	< LOD	< LOD	0.2	
3 – 15 mm	17/10/2022	0.27	0.24	0.16	0.15	0.2	0.2
	18/10/2022	0.25	0.28	0.17	0.10	0.2	
5 – 21 mm	17/10/2022	0.33	0.37	0.27	0.23	0.3	0.4
	18/10/2022	0.50	0.34	0.35	0.28	0.4	
6 – 21 mm	17/10/2022	0.28	0.51	0.39	0.34	0.4	0.6
	18/10/2022	0.81	0.78	0.60	0.43	0.7	

¹ Composite Wood Products Airborne Toxic Control Measure (ATCM) Title 17, California Code of Regulations, Sections 93120-93120.12, Third Party Certification Guideline: Establishing a Correlation With an Acceptable Correlation Coefficient ("r", Value), Guideline No: CWP-10-001 dated 08 June 2010

² Statements on conformity assessment/classification were made on the basis of the measurement results obtained. Measurement uncertainties are not included in the assessment (ILAC G8 03/2009 " Guidelines on the Reporting of Compliance with Specification" Section 2.7).

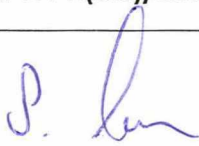
5.2 Test chamber method EN 717-1

Sample	Formaldehyde release EN 717-1			*	Evaluation acc. to German Prohibition of Chemical Ordinance ³ Quality fulfilled	
	Unit	Measured value	Measured value multiplied by 2		Yes	No
1 – 9 mm	ppm	< LOD	< LOD	I (192 h)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	µg / m ³	< LOD	< LOD			
2 – 9 mm	ppm	< LOD	< LOD	I (312 h)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	µg / m ³	< LOD	< LOD			
3 – 15 mm	ppm	< LOD	< LOD	I (168 h)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	µg / m ³	< LOD	< LOD			
5 – 21 mm	ppm	0.01	0.02	II (552 h)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	µg / m ³	13	26			
6 – 21 mm	ppm	0.01	0.02	II (336 h)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	µg / m ³	12	24			

- * cancellation criteria EN 717-1:
- I lower detection limit over a testing time of 4 days
 - II linear regression function from the test results of 4 consecutive days does not increase by more than 2 µg/m³
 - III the decline of the calculated concentration curve is equal or lower than 5% over the testing time of 4 days (within 28 days)
 - IV completely regression curve (max. 28 days)

6 Applicable QCL

Sample	Gas analysis method ISO 12460-3 [mg/m ² h]
	Shipping QCL E1-2020
DF-PW-1-I-1(...6)/1...3-22-09-07	1.7



Dipl.-Ing. (FH) S. Hahn
Engineer in charge

³ German Chemical Prohibition Ordinance appendix 1 of §3 dated 2017-01-20 in connection with „Bekanntmachung analytischer Verfahren für Probenahmen und Untersuchungen für die in Anlage 1 der Chemikalien-Verbotsverordnung genannten Stoffe und Stoffgruppen vom 5. November 2018“ published on 26 November 2018, BAnz AT 26.11.2018 B2
 - Formaldehyde limit value acc. to German Prohibition of Chemical Ordinance 0.1 ppm (124 µg/m³)
 - Test results according to EN 717-1 are multiplied by the factor 2
 - according to UBA correspond to 0.1 ppm ≅ 124 µg/m³; <https://www.umweltbundesamt.de/themen/wirtschaftskonsum/produkte/bauprodukte/studien-zur-messung-bewertung-von-schadstoffen/formaldehydmissionen-pruefbedingungen-fuer>, Status 2019-06-12

Annex Shipping QCL – Gas analysis EN ISO 12460-3

Evaluation of the Shipping Quality Control Limit (SQCL) Correlation at application of test chamber method EN 717-1 and mill's quality control test method (QCM)

Product-specific correlation analysis with regard to implementation of the German PCO (01/01/2020)

Manufacturer:	Northwood - Severny Plywood Mill Proezd Yareslav Hasheka 1. Petropavlovsk city, Kazakhstan
Contract No./ Order No.:	2122074
Quality control test method:	Gas analysis test method EN ISO 12460-3
Test period:	2022
Tested composite wood product:	Plywood 9-24 mm

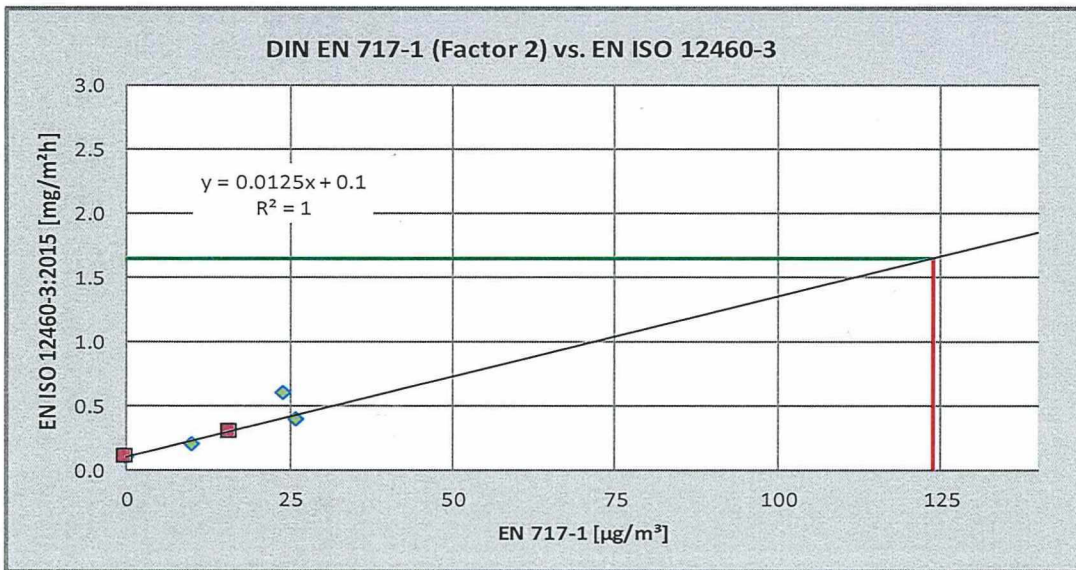
Correlation assessment analogous to EPA TSCA Title VI guidelines §770.20(d)(2)(i)(ii):

Minimum acceptable correlation coefficients

Number of data pairs (n)	5
Degrees of freedom	3
"r _{MIN} "	0.878
"R ² " of correlation	1.000
"r" of correlation	1
"r" ≥ "r _{MIN} "	Yes

Degrees of Freedom (n-2)	"r" value
3	0.878
4	0.811
5	0.754
6	0.707
7	0.666
8	0.632
9	0.602
10 or more	0.576

Formaldehyde limit value acc. to German PCO	0.1 ppm \triangleq 124 $\mu\text{g}/\text{m}^3$ DIN EN 717-1 (Factor 2)	SQCL E1-2020 [mg/m ² h] 1.7
Formaldehyde limit value acc. to IKEA IOS-MAT-0181 (V3)	0.05 ppm \triangleq 62 $\mu\text{g}/\text{m}^3$ DIN EN 717-1	



Sample Code	Thickness [mm]	Manufacturer	EPH	
		HCHO release [mg/m ² h]	HCHO release [µg/m ³]	
		EN ISO 12460-3	EN 717-1	EN 717-1 (x2)
Total average value		0.3	8	16
Blank value		0.1	0	0
DF-PW-1-I-1/1...3-22-09-07	9	0.2	< LOD	< LOD
DF-PW-1-I-2/1...3-22-09-07	9	0.2	< LOD	< LOD
DF-PW-1-I-3/1...3-22-09-07	15	0.2	< LOD	< LOD
DF-PW-1-I-5/1...3-22-09-07	21	0.4	13	26
DF-PW-1-I-6/1...3-22-09-07	21	0.6	12	24

* Note: Calculation of SQCL based on the LOD for EN 717-1 (10 $\mu\text{g}/\text{m}^3 = 0.008$ ppm)
Calculation of average value EN 717-1 (x2): < LOD = 10 $\mu\text{g}/\text{m}^3$