

JSC Cherepovets Plywood & Furniture Plant  
Proyehzhaya Str. 4  
162604 Cherepovets  
Russia

Fraunhofer Institute for Wood Research  
Wilhelm-Klauditz-Institut WKI

Director  
Prof. Dr.-Ing. Bohumil Kasal

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

Bienroder Weg 54 E  
38108 Braunschweig | Germany

**Bettina Meyer**  
Project manager formaldehyde analytics  
Quality Assessment  
Phone +49 (0) 531 2155 375 | Fax +49 (0) 531 2155 907  
bettina.meyer@wki.fraunhofer.de  
www.wki.fraunhofer.de

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Braunschweig,  
15 August 2016

### Test Report No. QA - 2016 - 2133

**Client:** JSC Cherepovets Plywood & Furniture Plant  
Proyehzhaya Str. 4  
162604 Cherepovets  
Russia

**Objective of the test:** Supervision of uncoated wood-based materials according to the Final Regulation Order of Airborne Toxic Control Measure to Reduce Formaldehyde Emission from Composite Wood Products, 93120-93120.12, title 17, California Code of Regulations, § 93120 - Quarterly Chamber Test - Quarter 2/2016.

**Product name:** Birch Plywood

**WKI-Identity-Number:** 3187

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The test report comprises 4 pages and 4 tables.

This test report is not permitted to be published incompletely. A publication in extracts is in any case subject to the previous consent of Fraunhofer-Institut für Holzforschung, Wilhelm-Klauditz-Institut (WKI), Bienroder Weg 54E in 38108 Braunschweig (Germany). The test results exclusively refer to the objects of the test. The test material was used up.



## 1. Task

By order of the State of California Air Resource Board (CARB) with reference to the executive order W-16-004 the Fraunhofer-Institut für Holzforschung, Wilhelm-Klauditz-Institut (WKI), was approved as ARB third party certifier to certify uncoated wood based products according to the Final Regulation Order of "Airborne Toxic Control Measure to Reduce Formaldehyde Emission from Composite Wood Products", 93120-93120.12, title 17, California Code of Regulations, § 93120.

Messrs. JSC Cherepovets Plywood & Furniture Plant in 162604 Cherepovets (Russia) assigned WKI to determine by measurements the formaldehyde emission potential of wood-based panels according to the requirements published by CARB referring to the Final Regulation Order of Airborne Toxic Control Measure to Reduce Formaldehyde Emission from Composite Wood Products, 93120-93120.12, title 17, California Code of Regulations, § 93120.

A supervision contract with No. 0697 dated 6 January 2009 was signed by the customer.

The determination of formaldehyde release should be carried out according to § 93120.9 "Test methods". According to § 93120, Appendix 2 (f)(3)(A) the quarterly chamber test has to be carried out for uncoated wood-based panels by using the primary or secondary test method for each production line of each plant.

### 1.1. Secondary test method

Referring to § 93120.9 (a)(2) a secondary method, defined as specified in ASTM D 6007 "Determining Formaldehyde Concentration in Air from Wood Products Using a Small Scale Chamber" can be used to determine formaldehyde release.

Equivalence has been shown and established between the American standard ASTM E 1333 "Determining Formaldehyde Concentration in Air and Emission Rates from Wood Products Using a Large Chamber" and ASTM D 6007 "Determining Formaldehyde Concentration in Air from Wood Products Using a Small Scale Chamber" according to § 93120.9 (a)(B).

According to § 93120.9 (a)(2)(A) for the secondary method as ASTM D 6007 nine specimens have to be tested in groups of three specimens. Three test results of small scale chamber test were received and averaged, representing one data point of the panel.

## 2. Test material and data of receipt

Product:	plywood,unfaced
Product name:	Birch Plywood
Technical class:	CARB Phase 2
Plant:	JSC Cherepovets Plywood & Furniture Plant in 162604 Cherepovets, Russia
Thickness (mm):	18
Thickness range (mm):	$2 \leq 40$
WKI-Identity-Number:	3187
Production date:	21 June 2016

The sample material was selected, marked by a WKI's representative on 22 June 2016 and sent to the WKI for examination.

The samples arrived at WKI packed separately in polyethylene plastic foil and stored under room conditions. Table 1 shows the data of receipt and test. The test material was used up.

## 3. Execution of the test

Referring to chamber test according to ASTM D 6007 three samples with a total surface area of 0.43 m<sup>2</sup> (for particleboard or plywood) or 0.26 m<sup>2</sup> (for MDF) capable of emission were positioned vertically standing with a minimum distance of 0.15 m between each specimen in a closed chamber with a volume of 1 m<sup>3</sup>. The conditioning of the samples was done for seven days  $\pm$  3 h at a temperature of  $(24 \pm 3)$  °C and a relative humidity of  $(50 \pm 5)$  %. The air exchange rate was adjusted to 2 AC/h.

Subsequent to seven-day-conditioning period the 1 m<sup>3</sup> chamber was operated at  $25 \pm 1$  °C, a relative humidity of  $(50 \pm 4)$  % and an air exchange rate of  $(0.5 \pm 0.05)$  AC/h.

The formaldehyde concentration in the chamber was measured by taking air samples at a test period of 19 and 20 hours. To this end a gas quantity of at least 0.12 m<sup>3</sup> at a rate of approximately 2 L/min 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 acetyl/acetone method described in EN 717-1:2005-01.

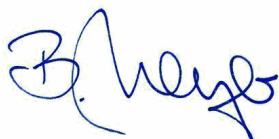
#### 4. Test results

In table 1 and 2 enclosed to the test report the data of receipt and test parameter are mentioned. The formaldehyde release values for chamber tests according to ASTM D 6007 of the tested samples of Messrs. JSC Cherepovets Plywood & Furniture Plant in 162604 Cherepovets (Russia ) are specified in table 3.

Referring to the test results an average formaldehyde concentration of 0.01 ppm was determined for three 1 m<sup>3</sup> chamber tests according to ASTM D 6007 "Determining Formaldehyde Concentration in Air from Wood Products Using a Small Scale Chamber" (1 ppm  $\triangleq$  1.24 mg HCHO/m<sup>3</sup> air at 23°C and 1013 hPa).

The limit values according to the requirements of the Final Regulation Order of "Airborne Toxic Control Measure to Reduce Formaldehyde Emission from Composite Wood Products", 93120-93120.12, title 17, California Code of Regulations, § 93120.2 (a) "Formaldehyde Emission Standards for Hardwood Plywood (HWPW), Particleboard (PB), and Medium Density Fiberboard (MDF)" are listed in Table 4.

A supervision contract exists.



Bettina Meyer  
Official in charge



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

Table 1: Test material, data of receipt and test  
- Quarterly chamber test -

Product: plywood, unfaced  
Product name: Birch Plywood  
Technical class: CARB Phase 2  
Plant: JSC Cherepovets Plywood & Furniture Plant  
in 162604 Cherepovets, Russia  
Thickness (mm): 18  
WKI-Identity-Number: 3187  
Production date: 21 June 2016  
Audit date: 22 June 2016

Test material, data of receipt and test - Quarterly chamber test -					
Sample-ID	Thick- ness [mm]	Number of boards	Size of boards app. [m]	Data of receipt	Test date
					Chamber method ASTM D 6007
3187	18	3	1.2 x 2.0	1 July 2016	13 July 2016

Table 2: Test parameter of ASTM D 6007: "Determining Formaldehyde Concentration in Air from Wood Products Using a Small Scale Chamber"  
- Quarterly chamber test -

Conditioning data					
Temperature of conditioning:	(24 ± 3)	[°C]	Rel. humidity of conditioning:	(50 ± 5)	[%]
Minimum distance between samples:	0.15	[m]	Formaldehyde background concentration:	0.01	[ppm]

Chamber data			
Chamber volume:	1		[m³]
Temperature:	(25 ± 1)		[°C]
Rel. humidity:	(50 ± 4)		[%]
Type of wood based material:	particleboard or plywood	MDF	
Loading ratio*:	0.43	0.26	[m²/m³]
Air exchange rate:	0.5	0.5	[1/h]
Sample size (length x width)*:	0.5 x 0.143	0.5 x 0.085	[m]
Number of panels per chamber**:	3	3	
Number of exposed surfaces:	6	6	

\* depending on the type of wood based material tested

\*\* samples cut evenly distributed out of one large board (size see table 1)

Table 3: Test results of ASTM D 6007 “Determining Formaldehyde Concentration in Air from Wood Products Using a Small Scale Chamber”

Product: plywood,unfaced  
 Product name: Birch Plywood  
 Technical class: CARB Phase 2  
 Plant: JSC Cherepovets Plywood & Furniture Plant  
 in 162604 Cherepovets, Russia  
 Thickness (mm): 18  
 Production date: 21 June 2016

Sample set 1				3187-1
Test period	19	20	[h]	Average sample set 1
Temperature test conditions	24.6	24.7	[°C]	
Rel. humidity test conditions	49.9	49.8	[%]	
Determined chamber value	0.01	0.01	[ppm]	
Reported Chamber value corrected to 25°C/50%RH	0.01	0.01	[ppm]	0.01 ppm

Sample set 2				3187-2
Test period	19	20	[h]	Average sample set 2
Temperature test conditions	24.4	24.7	[°C]	
Rel. humidity test conditions	49.6	49.5	[%]	
Determined chamber value	0.01	0.01	[ppm]	
Reported Chamber value corrected to 25°C/50%RH	0.01	0.01	[ppm]	0.01 ppm

Sample set 3				3187-3
Test period	19	20	[h]	Average sample set 3
Temperature test conditions	24.7	25.0	[°C]	
Rel. humidity test conditions	49.9	49.9	[%]	
Determined chamber value	0.01	0.01	[ppm]	
Reported Chamber value corrected to 25°C/50%RH	0.01	0.01	[ppm]	0.01 ppm

Sample set 1 3187-1	Sample set 2 3187-2	Sample set 3 3187-3	Average value WKI-ID-No.: 3187
0.01 ppm	0.01 ppm	0.01 ppm	0.01 ppm

Table 4: Final Regulation Order of “Airborne Toxic Control Measure to Reduce Formaldehyde Emission from Composite Wood Products”, 93120-93120.12, title 17, California Code of Regulations, §93120.2 (a), emission standards, according to table 1: “Phase 1 and Phase 2 formaldehyde emission standards for hardwood plywood (HWPW), particleboard (PB) and medium density fibreboard (MDF)<sup>1</sup>”

- Phase 1 (P1) and Phase 2 (P2) Emission Standards (ppm) –						
Effective Date	HWPW-VC	HWPW-CC	PB	MDF	Thin MDF	
1 January 2009	P1: 0.08	-	P1: 0.18	P1: 0.21	P1: 0.21	
1 July 2009	-	P1: 0.08	-	-	-	
1 January 2010	P2: 0.05	-	-	-	-	
1 January 2011	-	-	P2: 0.09	P2: 0.11	-	
1 January 2012	-	-	-	-	P2: 0.13	
1 July 2012	-	P2: 0.05	-	-	-	

<sup>1</sup> Based on the primary test method [ASTM E 1333-96 (2002)] in parts per million (ppm) HWPW-VC: veneer core; HWPW-CC: composite core