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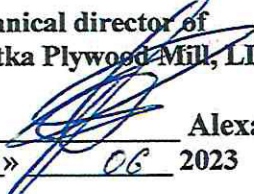

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**Birch construction and substandard plywood  
Specifications  
TU 16.21.12-001-93222532-2023  
(Supersede TU -001-93222532-2015)**

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**Content**

1 SCOPE.....	3
2 REFERENCE DOCUMENTS .....	3
3 TECHNICAL REQUIREMENTS.....	3
4 SAFETY REQUIREMENTS AND ENVIRONMENT PROTECTION .....	7
4.1 Environment protection requirements.....	7
4.2 Fire safety requirements .....	7
4.3 Labour protection requirements .....	7
5 ACCEPTANCE PROCEDURE .....	8
6 CONTROL METHODS .....	8
7 TRANSPORTATION AND STORAGE .....	8
8 MANUFACTURER'S GUARANTEE .....	9
CHANGE REGISTRATION SHEET .....	10

## 1 SCOPE

Translate to English: The present technical specifications apply to both construction-grade and substandard birch plywood. The plywood is intended for construction as non-load-bearing elements, for the manufacture of formwork in private construction, the production of furniture, packaging, household needs, as well as for application areas where surface defects do not play a decisive role.

## 2 REFERENCE DOCUMENTS

These Specification uses reference documents for the following standards:

GOST 12.1.044-89 (ISO 4589-84) Occupational Safety Standards System. Fire and explosion hazard of substances and materials. Nomenclature of indices and methods of their determination.

GOST 12.4.011-89 Occupational Safety Standards System. Means of protection. General requirements and classification.

GOST 427-75 Measuring metal rulers. Basic parameters and dimensions. Specification.

GOST 2140-81 Visible defects of wood. Classification, terms and definitions, methods of measurement.

GOST 3916.1-2018 Plywood for general use with outer layers of deciduous veneer.

GOST 6507-90 Micrometers. Specifications.

GOST 7502-98 Measuring metal tapes. Specifications.

GOST 8673-2018 Plywood panels. Specifications

GOST 8925-68 Flat clearance gauges for machine retaining devices. Design.

GOST 9620-94 Laminated glued wood. Sampling and general requirements for testing

GOST 11358-89 Dial-type thickness gauges and dial-type wall thickness gauges graduated in 0,01 and 0,1 mm. Technical Specifications.

GOST 27678-2014 Wood-based panels and plywood. Perforator method for determination of formaldehyde content.

GOST 30255-2014 Furniture, wood-based and polymer materials. Methods for determination of formaldehyde and other harmful volatile chemicals emission in climatic chambers.

GOST 30427-96 Plywood for general use. Classification of veneer surfaces by appearance

GOST 32155-2013 Wood-based panels and plywood. Determination of formaldehyde emission by the gas analysis method.

GOST R 53920-2010 Laminated plywood. Specifications

TU 16.21.12-002-93222532-2021 Birch faced plywood

TU 16.21.12-006-93222532-2022 FSF brand general-purpose plywood with outer layers of birch veneer

TU 16.21.12-007-93222532-2020 Birch plywood Segezha Ecofloor

TU 16.21.12-011-93222532-2021 FK brand general-purpose plywood with outer layers of birch veneer

TU 16.21.12-012-93222532-2021 Faced birch plywood FOK

## 3 TECHNICAL REQUIREMENTS

### 3.1 Key parameters and characteristics

**3.1.1** Construction and substandard plywood is a by-product in the production of plywood according to TU 16.21.12-006-93222532-2022 "FSF brand general purpose plywood with outer layers of birch veneer", TU 16.21.12-002-93222532-2021 "Birch faced plywood", TU 16.21.12-011-93222532-2021 "FK brand general purpose plywood with outer layers of birch veneer", TU 16.21.12-012-93222532-2021 "Faced birch plywood FOK", TU 16.21.12-007-93222532-2020 "Birch plywood Segezha Ecofloor", GOST 3916.1, GOST R 53920-2010, GOST 8673-2018.

**3.1.2** Plywood is considered to be made of the wood species from which the outer layers are made. Birch veneer is used for the production of outer layers of plywood. The use of veneer from other hardwood species is allowed for internal layers.

**3.2** Based on the degree of water resistance of the adhesive joint and the conditions of use, plywood is divided into the following brands:

FK, FOK - water-resistant plywood, glued with urea-formaldehyde adhesives, for indoor use;

FSF, FOF - plywood with increased water resistance, glued with phenol-formaldehyde adhesives, for indoor and outdoor use.

**3.3** All wood defects and processing defects established in the technical specifications for plywood (see p. 3.1) are allowed for plywood, except for those specified in Table 1:

Table 1.1 - Standards for limiting defects in wood and processing defects of unfaced plywood

<b>Wood flaws and processing defects</b>	<b>Limits</b>	
	<b>Construction plywood</b>	<b>Substandard plywood</b>
Knots (pin knots, sound knots, intergrown, unintergrown, light, dark, knot holes), bore holes	Permitted	Permitted
Splits (open and close)	Permitted	Permitted
Irregularities in wood structure ( <b>irregular fibers, Curly grain</b> , dip grain, curliness, dark eyes, heartwood, spots)	Permitted	Permitted
Fungal damages: fungal spots and stripes, bluestain (blueing), color stain, dark stain, brown stain, decay.	Permitted	Permitted
Chemical discoloration (brown stain, light chemical discoloration)	Permitted	Permitted
Mechanical damages and processing defects (scratch, dent, comb, tear-out of fibers, puncture, waviness, fuzziness, ripple, trace of veneer peeling, glue penetration, sand-through, glued veneer particles, roughness of surface, wane).	Permitted	Permitted
Veneer patches, loose patches	Permitted	Permitted
Stains of industrial origin: glue and other contaminants	Permitted	Permitted
Overlap of face layers, glued waste, presence of adhesive tape	Permitted	Permitted
Warping	Permitted	Permitted
Shortage of veneer in face and internal plies	Permitted up to 50% at one panel surface	Permitted
Local delamination of a plywood panel (bubbles in inner layers of plywood)	Permitted max. 10 % of a panel area (to be determined visually)	Permitted while maintaining a panel integrity
Out-of-squareness and out-of-straightness of edges	Permitted max. 10 mm per 1 m of the length of a panel edge	Not regulated

Table 1.2 - Standards for limiting defects in faced plywood

Defects	Limits	
	Construction plywood	Substandard plywood
Delamination or lack of film coating	Permitted	Permitted
Shedding, secondary laminate, local swelling of film, temperature stains, stripes and stains from film, microcracks (hair cracks)	Permitted	Permitted
Burnt film (burnout) from defects in the outer layer: cracks, damage, loose knots, unsmooth peeling, lack of veneer in inner layers	Permitted	Permitted
Traces of defects and flaws of inner layers, sanding defects: whitish spots and stripes, traces of a veneer joint (seam) (darkening)	Permitted	Permitted
Dents and scratches, prints from press plates, film overlays, pressed waste, paint smudges on a panel surface	Permitted	Permitted
Warping	Permitted	Permitted
Trimming defects	Permitted	Permitted
Local delamination of a plywood panel (bubbles in inner layers of plywood)	Permitted max. 10 % of a panel area (to be determined visually)	Permitted while maintaining a panel integrity
Out-of-squareness and out-of-straightness of edges	Permitted max. 10 mm per 1 m of the length of a panel edge	Not regulated

In the inner layers, wood flaws and processing defects are permitted, which do not affect its quality and size.

**3.4** Dimensions of plywood panels shall conform to the values indicated in Tables 2:

Table 2 –Dimensions of plywood panels

Size, mm	Tolerance, mm	
	Construction plywood	Substandard plywood
<b>Length and width</b>		
Construction 1200, 1220, 1250, 1500, 1525, 2100, 2135, 2440, 2500, 3000, 3050, 3965 Substandard 1000 – 3965	± 10,0	-
<b>Thickness</b>		
3 – 40	± 1,5	-

Different sizes are permissible if confirmed by the consumer

**3.5 Designation**

The plywood designation shall include:

- name of the product;
- species of outer veneers;
- brand;
- dimensions (for construction plywood);

- emission class;
- reference to these Specifications.

Here below there is an example of designation of birch general-purpose construction plywood of FSF brand, length 1220 mm, width 2440 mm, thickness 12,0 mm with birch veneer outer layers, with outer veneers grade combination:

***Birch construction plywood of FSF brand, 1220x2440x12, E0,5, TU 16.21.12-001-93222532-2023.***

Here below there is an example of designation of birch substandard plywood of FOF brand, length 1250 mm, width 2500 mm:

***Birch substandard plywood of FOF brand, E1, TU 16.21.12-001-93222532-2023.***

### 3.6 Stress-related plywood parameters

The stress-related parameters of plywood are not regulated.

### 3.7 Formaldehyde content and formaldehyde emission

The formaldehyde content in plywood panels and formaldehyde emission from plywood into the room air depending on the emission class shall conform to the values specified in Table 3.

Table 3 – Formaldehyde content in plywood panels and formaldehyde emission from plywood into the room air

Emission class	Formaldehyde content per 100 g of absolutely dry mass of plywood, mg.	Formaldehyde emission	
		Chamber test, mg/m <sup>3</sup> of air	Chamber test, mg/m <sup>3</sup> of air
E 0,5 (FSF, FK)	Through and including 4,0	Through and including 0,01	Through and including 1,5
E1 (FOF, FOK)	Through and including 8,0	Upwards 0,01 through and including 0,124	Upwards 1,5 through and including 3,5 or below 5,0 during 3 days after manufacturing

### 3.8 Plywood accounting

Plywood is counted and registered in cubic meters. The volume of a single panel shall be measured accurately to within 0,00001 m<sup>3</sup>, the volume of a batch of panels shall be measured accurately to within 0,01 m<sup>3</sup>. The area of a single panel shall be measured accurately to within 0,01 m<sup>2</sup>, the area of all panels in a batch shall be measured accurately to within 0,5 m<sup>2</sup>.

### 3.9 Plywood marking

The plywood packages are marked with labels in Russian and English with the following information:

- country of origin;
- manufacturer's name and/or trademark;
- manufacturer's registered address;
- plywood name and designation;
- formaldehyde emission class;
- size and thickness of panels in a package (for construction plywood);
- plywood brand;
- plywood grade;
- plywood surface type (construction, substandard);
- number of panels in a package, volume;
- date of manufacturing;
- barcode with the identification number of the plywood package;

- Keep Dry marking;
- reference to these Specifications.

Marking on each sheet of plywood is applied only at the request of the consumer.

### **3.10 Packaging**

Construction plywood should be formed into packs with a height of 400 or 600 mm, separately according to the surface type (faced and unfaced), dimensions (length, width, and thickness), and degree of water resistance (water-resistant and high water resistance).

Substandard plywood should be formed into packs with a height of up to 600 mm, separately by surface type (faced and unfaced), degree of water resistance (water-resistant and high water resistance), without regard to dimensions (length, width, and thickness). It is permitted to form packs of substandard plywood of a different height.

When assembling packs of veneered plywood, it is permitted to combine different types of films.

Packs of birch plywood are packaged in covers made of thin plywood. The packs should be wrapped with packaging tape. The use of various types of packaging or delivery of plywood without packaging is permitted.

## **4 SAFETY REQUIREMENTS AND ENVIRONMENT PROTECTION**

### **4.1 Environment protection requirements**

Plywood of emission class E0.5/E1 does not have a negative impact on humans or the environment during use, transportation, and storage. The content of harmful chemical substances emitted into the air of residential and public buildings during the use of plywood products should meet the requirements set by national sanitary and epidemiological surveillance bodies. This complies with SanPiN 1.2.3685-21 "Hygienic norms and requirements for ensuring the safety and (or) harmlessness for human factors of the habitat".

Plywood shall be manufactured using materials and components approved for use by national sanitary and epidemiological surveillance bodies. The composition of plywood does not contain raw materials, materials, and components classified as hazardous waste.

### **4.2 Fire safety requirements**

Plywood refers to products for general use.

According to Section 6, par. 8 of the Federal Law dated July 22, 2008 No 123-FZ "Technical Regulation concerning fire safety requirements", general-purpose products do not require a fire safety declaration to certify compliance with fire safety rules.

Plywood refers to a group of construction materials - highly combustible (C4), having flue gas temperature of over 450°C.

Materials used for birch plywood manufacturing are not explosive.

Production facilities used for plywood manufacturing and application have B class of fire rating.

### **4.3 Labour protection requirements**

Plywood production generates such hazardous volatile substances as phenol and formaldehyde which are the components of phenol formaldehyde resins used as bonding agents for plywood.

Only persons aged 18 and above and having no medical contraindications are allowed to be involved in plywood manufacture. Health checks are to be conducted in accordance with the applicable orders of the Russian Federation Ministry of Public Health. Persons involved in plywood manufacture must have personal protection devices as prescribes GOST 12.4.011.

Maximum permissible airborne concentrations of volatile substances at workplaces in plywood manufacturing and storage facilities shall be controlled in accordance with GOST 12.1.005.

## **5 ACCEPTANCE PROCEDURE**

**5.1** Plywood is presented for acceptance in batches. The batch is a quantity of plywood panels of the same mark and emission class manufactured during the same working shift. The batch is covered by a single quality document which shall include the following information:

- country of origin;
- manufacturer's name and/or trademark and address;
- plywood designation;
- quantity of panels in a batch;
- conformity certification.

**5.2** At least two packages of a batch shall be selected randomly for dimensional and appearance checks.

**5.3** The plywood presented for acceptance is subject to the results of tests for the emission of free formaldehyde from plywood, produced in accordance with paragraph 3.1 of these specifications.

**5.4** A batch is considered to meet the requirements if the number of panels in the checked packs is less than or equal to 5% and the requirements of paragraph 5.3 are met.

## **6 CONTROL METHODS**

**6.1** Sampling according to GOST 9620, GOST 30255, GOST 32155.

**6.2** The length and width of a plywood panel are measured in two points parallel to edges at the distance of min. 100 mm from edges, using a metal tape according to GOST 7502, the tolerance is 1 mm. The actual length (width) of a panel is an arithmetic mean value of the two measured values.

**6.3** The thickness shall be measured at the distance of min. 25 mm from edges and at the center of each panel side. The measurements are performed using a thickness gauge graduated in 0,1 mm (max) according to GOST 11358. The actual width is an arithmetic mean value of the results of four measurements.

**6.4** The formaldehyde content is determined according to GOST 27678, the formaldehyde emission is determined according to GOST 30255 or GOST 32155.

**6.5** Wood faults and process-induced defects are evaluated according to GOST 30427, GOST 2140.

**6.6** The straightness deviation of a plywood panel edges is determined by measuring the maximum gap between the edge of the panel and the edge of the metal ruler according to GOST 427 by a clearance gauge according to GOST 8925 with an accuracy of 0,2 mm.

**6.7** The squareness check is performed according to GOST 30427.

## **7 TRANSPORTATION AND STORAGE**

The plywood is transported in covered vehicles in accordance with rules of carriage applicable to this type of transport.

The plywood is stored in horizontally stacked packages on bottom plates or wooden blocks indoors at the temperature ranging from -40°C to +50°C and maximum relative humidity of 80% RH. For plywood with width of up to 2500 mm, at least three wooden blocks are to be used, for plywood with width of over 2500 mm at least four wooden blocks are to be used.

High humidity and temperature variations may cause swelling in thickness, surface damages, as well as internal stresses and eventual delamination of plywood.



## **8 MANUFACTURER'S GUARANTEE**

The manufacturer guarantees that the quality of plywood conforms to these Specifications as long as the consumer follows the transportation and storage rules.

The warranty storage period for water-resistant plywood is three years from the day it is received by the consumer. The warranty storage period for plywood with increased water resistance is five years from the day it is received by the consumer.

