

APPROVED BY



**Member of the Board
Vice-President
Head of Plywood and Boards Division**

Alexey B. Stepanov

03 2022

BIRCH PLYWOOD SEGEZHA FLEX PLY COATED AND UNCOATED

Technical Specifications TU 16.21.12-013-93222532-2022

Effective date: 23 03 2022

AGREED BY:

Technical Director of
Vyatka Plywood Mill LLC

[Signature]
"23" 03 2022

Alexandr I. Bessonov

Sales Director

[Signature]
"23" 03 2022

Roman M. Ayvarzhi

Operational Director
Vyatka Plywood Mill LLC

[Signature]
"23" 03 2022

Konstantin. V. Vikharev

Chief Technologist

[Signature]
"23" 03 2022

Ilya.A. Antonov

КОНТРОЛЬНЫЙ ЭКЗЕМПЛЯР

Developed by:
Head of QCD

[Signature]
"23" 03 2022

Vera V. Alpushkina

УЧТЕНО 23.03.22

Content

No. section	Section title	Page
1	Scope	3
2	Reference documents.....	3
3	Technical requirements.....	4
4	Safety and environmental requirements.....	10
5	Operating recommendations.....	11
6	Acceptance procedure.....	12
7	Control methods.....	13
8	Transportation and storage.....	14
9	Manufacturer's guarantees.....	15
 Annexes		
Annex A (mandatory)	Standards of defects limitations for grades of plywood- SEGEZHA FLEX PLY coated	16
Annex B (mandatory)	Standards of wood flaws and processing defects limita- tions for outer layers of plywood SEGEZHA FLEX PLY uncoated	18
Annex B (mandatory)	Terms and definitions of process-related defects	22

1 SCOPE

These Technical Specifications apply to plywood SEGEZHA FLEX PLY, made of 100% birch with a special set of physical and mechanical characteristics that allow a flat panel to take a curved shape.

Birch Plywood SEGEZHA FLEX PLY is available in two types:

- Birch Plywood SEGEZHA FLEX PLY coated is a flexible film-faced plywood with a minimum allowable bending radius of ~ 0.8 meters, designed for applications in the formwork of radial walls, tunnels, bridge arches and round columns. The minimum bending radius is defined as the maximum displacement of the deflection axis of a plywood panel in the direction parallel to the orientation of wood fibers: for transverse plywood of size 1220x2440 the maximum displacement of the deflection axis will be ~ 0.8 m, for longitudinal plywood of size 2440x1220 it will be ~ 0.2 m. Plywood SEGEZHA FLEX PLY coated significantly increases the efficiency of works on construction of curved structures with special requirements for the concrete surface quality.

- Birch Plywood SEGEZHA FLEX PLY uncoated is a flexible plywood with a wide variation range of bending radius from 0.4 meters. It is used as curved finishing elements of vehicles, in construction, in design and decoration of round-shaped objects.

2 REFERENCE DOCUMENTS

This Standard uses reference documents for the following standards:

GOST R 53920-2010 Laminated plywood. Technical Specifications

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

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 rules. Basic parameters and dimensions. Technical Specifications

GOST 3749-77 Checking 90° squares. Technical Specifications

GOST 6507-90 Micrometers. Technical Specifications

GOST 7502-98 Measuring metal tapes. Technical 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 9621-72 Laminated glued wood. Method of determination of physical properties

GOST 9622-2016 Laminated glued wood. Methods for determination of ultimate strength and modulus of elasticity in tension

GOST 9624-2009 Laminated glued wood. Method for determination of shear strength

GOST 9625-2013 Laminated glued wood. Methods for determination of ultimate and modulus of elasticity in static bending

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

GOST 14192-96 Cargo marking

GOST 18321-73 Statistical quality control. Methods of random sampling of piece products

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. General rules of classification of veneer surfaces by appearance

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

EN 310:2005 Wood-based panels. Determination of modulus of elasticity in bending and of bending strength

EN 314: Part 1 (2005), Part 2 (1997) Plywood. Shearing strength. Test methods

EN 322:1993 Wood-based panels. Determination of moisture content

EN 323:1993 Wood-based panels. Determination of density

EN 324:2005 Parts 1, 2 Wood-based Panels. Determination of panel dimensions

EN 326-1:2005 Wood-based panels. Sampling, cutting and inspection. Part 1: Sampling and cutting of test pieces and expression of test results

EN 326-2:2014 Wood-based panels. Sampling, cutting and inspection. Part 2: Initial type tests and factory production control

EN 636:2012+A1:2015 Plywood - Technical Specifications

EN ISO 12460-3: 2015 Wood-based panels. Determination of formaldehyde emissions. Part 3. The gas analysis method

EN 13986:2004+A1:2015 Wood-based panels for use in construction. Characteristics, evaluation of conformity and marking

MG 2.2-006-2019 "Quality tests of film-faced plywood."

HS 2.1.6.1338-03 Threshold limit value (TLV) of harmful substance in the atmospheric air of populated areas;

HS 2.1.6.2309-07 Safe reference level of impact (SRLI) of harmful substance in the atmospheric air of populated areas. Hygienic standards. Hygienic standards.

3 TECHNICAL REQUIREMENTS

3.1 Key parameters and dimensions

3.1.1 Plywood SEGEZHA FLEX PLY coated is divided into types of coating and grades depending on processing defects.

3.1.2 According to the type and method of coating, plywood SEGEZHA FLEX PLY coated is divided by surface types:

- F - smooth (glossy) surface;
- U - surface without film coating.

Note:

1. It is possible to manufacture and design plywood with various combinations of surfaces upon agreement with the consumer.

2. For the uncoated surface, the outer layer grade (I (B)/II (BB)) shall be indicated.

3. Plywood SEGEZHA FLEX PLY coated in the standard design is available with painted ends. It is possible to manufacture and mark plywood (N) with unpainted ends upon agreement with the consumer.

4. For film facing plywood SEGEZHA FLEX PLY coated, a special purpose phenolic film with increased flexibility is used.

3.1.3 Depending on processing defects, plywood SEGEZHA FLEX PLY coated is divided into 3 grades: I, II, III.

3.1.4 It is possible to manufacture plywood SEGEZHA FLEX PLY coated with various corporate logos.

3.1.5 Plywood SEGEZHA FLEX PLY uncoated is graded by appearance of outer layers and classified into sanded and non-sanded by the degree of mechanical processing of surface.

3.1.6 In appearance, plywood SEGEZHA FLEX PLY uncoated is produced in grades available depending on the combination of grades of the outer layers B, S, BB, CP (using Latin character notation) and I, II, III (using Roman numeral notation). Both Roman numerals and Latin characters can be used when referring to plywood.

3.1.7 Plywood SEGEZHA FLEX PLY uncoated is classified into the following groups by degree of mechanical processing of surface:

- non-sanded – NS;
- sanded one side – S1;
- sanded both sides – S2.

3.1.8 Dimensions of plywood panels and number of plies must conform to the values indicated in Tables 1 and 2.

3.1.9 Plywood SEGEZHA FLEX PLY is manufactured with longitudinal and transverse direction of wood fibers of outer layers.

3.1.10 Wood flaws and processing defects exceeding the limits set in Annex B are not allowed in the outer layers of plywood SEGEZHA FLEX PLY uncoated.

3.1.11 Defects exceeding the limits set in Annex A are not allowed on surface of plywood panels SEGEZHA FLEX PLY coated.

3.1.12 It is allowed to produce birch plywood SHOP with a conditional transverse (SHOP 1) or longitudinal (SHOP 2) trim on one edge up to 300 mm, the panel volume corresponds to a full size, but with a reduced merchantable part. In the SHOP (conditional trim) area, all defects are allowed except for the delamination of veneer and out-of-squareness.

Table 1

Nominal plywood thickness, mm	Number of plies, min	Sanded plywood uncoated and coated		Non-sanded uncoated plywood	
		Maximum deviation, mm	Thickness variation, mm	Maximum deviation, mm	Thickness variation, mm
4 (uncoated only)	3	+0.3 -0.5	0.6	+0.8 -0.4	1.0
6 (uncoated only)	5	+0.4 -0.5		+0.9 -0.4	
9	7	+0.4 -0.6		+1.0 -0.5	
12	9	+0.5 -0.7		+1.1 -0.6	
15	11	+0.6 -0.8		+1.2 -0.7	1.5

Note: Different thicknesses, tolerances and numbers of plies are permissible, if agreed with the consumer. Thus, the tolerances shall be calculated by the following formulas:
 - for sanded plywood: $+(0.2 + 0.03 S_{pl})$, $-(0.4 + 0.03 S_{pl})$;
 - for non-sanded plywood: $+(0.8 + 0.03 S_{pl})$, $-(0.3 + 0.03 S_{pl})$,
 where S_{pl} is a nominal plywood thickness.

Table 2

Length or width of plywood panels, mm	Maximum deviation, mm
1200, 1220, 1250	±2,0
1500, 1525	±3,0
2100, 2135, 2440, 2500	±3,0
3000, 3050, 3900, 3965	±3,5

Note:

1. It is allowed to produce birch plywood of other sizes and maximum deviations upon agreement with the consumer.
2. Tolerances for plywood sizes below 1200 are (+/-) 2.0 mm.
3. The plywood panel length is determined along the fibers direction of outer layers.

3.1.13 Plywood panels shall be cut at right angles. Maximum tolerance for squareness of panel edges is 1 mm per 1 m of the panel length. Maximum permissible difference of diagonal lengths is 1 mm per 1 m of the panel length.

3.1.14 Maximum deviation from the edges straightness is 1 mm per 1 m of the panels length.

3.2 Designation

The plywood designation shall include:

- product name;
- brand;
- combination of veneer grades of outer layers;
- emission class;
- sizes;
- density of resin-impregnated paper (hereinafter referred to as films) for coated;
- reference to these Specifications.

Here below there is an example of designation of plywood SEGEZHA FLEX PLY uncoated, with outer veneers grade combination II/II, emission class E0,5, sanded both sides, length 1250 mm, width 2500 mm, thickness 15 mm:

Birch plywood SEGEZHA FLEX PLY, uncoated, II/II (BB/BB), E0,5, W2(S2), 1250x2500x12, TU 16.21.12-013-93222532-2022

3.3 Requirements for raw and other materials

3.3.1 Birch veneer is used for production of outer layers of plywood.

3.3.2 Special layup scheme. The main number of veneer plies has a parallel fiber direction.

3.3.3 The thickness of veneer used for outer and inner layers shall not exceed 4 mm.

3.3.4 Internal plies may have wood faults and processing defects if these do not affect the quality and dimensional characteristics of plywood as prescribed in these Specifications.

3.3.5 Veneer patches of various shapes and sizes are used to plug knots, holes and cracks. These veneer patches must match the surface, hold tightly and have the same direction of the grain and be of the same species as the outer veneers. The patches must be of the same color as the main wood.

3.3.6 The following is used for the film-faced plywood manufacturing:

- uncoated sanded plywood;
- film based on thermosetting polymers for covering the outer layer of plywood;
- acrylic water-emulsion paint to protect the plywood edges during transportation.

3.3.7 Defects exceeding the limits stated in Annex A are not allowed on the surface of film-faced plywood. Terms and definitions of processing defects are given in Annex B.

3.4 The stress-related plywood parameters are indicated in Tables 3 and 4.

Table 4

Parameter	Thickness, mm	Stress-related value
1 Moisture content, %	4,0 – 15,0	5 – 12
2 Density, kg/m ³	4,0 – 15,0	650 – 730
3 Bending strength along the grain of outer veneers, MPa, min	upwards 4.0 to and including 12.0 12,0 -15,0	130 120

Parameter	Thickness, mm	Stress-related value	
4 Modulus of elasticity in static bending along the grain of outer veneers, MPa, min	upwards 4.0 to and including 12.0 12,0-15,0	16 000 14 000	
Uncoated			
5 Tensile strength along the grain, MPa, min:	4,0 – 6,0	60	
6 Impact viscosity in bending, kJ/m ²	12,0 – 15,0	34	
7 Hardness, MPa	9,0 – 15,0	20	
8 Thermal conductivity ratio, W (mK) at average density, kg/m ³	4,0 – 15,0	0,09	
300		0,13	
500		0,17	
700		0,24	
1000			
9 Water vapor transmission resistance ratio, wet test, with average density, kg/m ³	4,0 – 15,0	50	
300		70	
500		90	
700		110	
1000			
water vapor transmission resistance ratio, dry test, with average density, kg/m ³			150
300			200
500			220
700			250
1000			
10 Sound absorption factor, dB, for frequency range, Hz	4,0 – 15,0	0,10	
250 – 500		0,30	
1000 – 2000			
11 Sound insulation, dB	9,0 – 15,0	23,0	
12 Biological stability, hazard class	4,0 – 15,0	2	
Hazard class		2	
Natural resistance to:	4,0 – 15,0	3	
– wood-destroying fungi;		5	
– wood-destroying insects;		Dhy	
– capricorn beetles (Hybatchrupes);		Da	
– death-watch beetle (Anobium);		St	
– termites			
13 Flammability class	4,0 – 15,0	According to GOST 30244	
Coated			
14 Bonding strength of the coating to the plywood	9,0 – 15,0	The coating should not peel off at the point of intersection of 2 cut lines	
15 Steam resistance, score	9,0 – 15,0	No swelling, slight loss of gloss, no bubbles	
16 Resistance to hydrochloric acid (HCl)	9,0 – 15,0	The solution (HCl) color after the coating test is light yellow, colorless	

Parameter	Thickness, mm	Stress-related value
17 Resistance to sodium hydroxide (NaOH)	9,0 – 15,0	The solution (NaOH) color after the coating test is light yellow, colorless
18 Resistance to cement	9,0 – 15,0	No cement staining after interaction with plywood
19 Water permeability of facing coating, g/m ² , no more	9,0 – 15,0	200
<p>Note:</p> <ol style="list-style-type: none"> As the test results for SEGEZHA FLEX PLY coated according to paragraphs 1-4, the test results of billets for plywood overlaying (uncoated plywood) are accepted. Tests of plywood SEGEZHA FLEX PLY coated according to paragraphs 1-4 are carried out upon agreement with the consumer. Tests according to the indicators of paragraphs 5 to 18 are carried out upon agreement with the consumer. The water permeability of the facing coating is tested on samples film-faced on both sides. 		

Table 5

Average shear strength along the glue line, MPa	Wood rapture, %
Upwards of 0,2 through and including 0,4	Upwards of or equal to 80
Upwards of 0,4 through and including 0,6	Upwards of or equal to 60
Upwards of 0,6 but below 1,0	Upwards of or equal to 40
1,0 and upwards	-
<p>Note:</p> <ol style="list-style-type: none"> Preparation for the plywood tests is carried out according to one of four options: <ul style="list-style-type: none"> boiling in water for 1 hour; conditioning in water for 24 hours at the temperature of $(20 \pm 3)^\circ\text{C}$ for 24 hours (according to EN 314-1, paragraph 5.1.1); conditioning in boiling water for 4 hours, followed by drying in a drying oven with ventilation for 16-20 hours at a temperature of $(60 \pm 3)^\circ\text{C}$, conditioning in boiling water for 4 hours and cooling in water at the temperature of $(20 \pm 3)^\circ\text{C}$ for minimum 1 hour (according to EN 314-1 p.5.1.3); conditioning in boiling water for (72 ± 1) hours, followed by cooling in water at a temperature of $(20 \pm 3)^\circ\text{C}$ for minimum 1 hour (according to EN 314-1, paragraph 5.1.4). The method of sample preparation is selected as agreed with the customer. The wood rapture percentage shall be determined by the visual inspection. Shear tests are performed in different glue lines as agreed with the customer. 	

3.5 Formaldehyde content in plywood panels and formaldehyde emission from plywood into the room air depending on the emission class must conform to the values specified in the Table 6.

Table 6

Emission class	Formaldehyde content per 100 g of absolutely dry mass of plywood, mg	Formaldehyde emission	
		Chamber method, mg/m ³ of air	Gas analysis method, mg/m ² ×hour
E 0.5	Through and including 4.0	Through and including 0.01	Through and including 1,5

E1	Through and including 8.0	Upwards 0.01 Upwards and including 0.124 inclusive.	Upwards 1,5 through and including 3,5 or below 5.0 during 3 days after manu- facturing
Note: as test results of testing SEGEZHA FLEX PLY coated, the test results of billets for plywood overlaying (uncoated plywood) are accepted			

3.6 Plywood is counted and registered in cubic meters. The volume of a single panel shall be measured accurately to within 0,00001 m³, the volume of a batch of panels shall be measured accurately to within 0,01 m³. The area of a single panel shall be measured accurately to within 0,01 m², the area of all panels in a batch shall be measured accurately to within 0,5 m².

3.7 Plywood marking

3.7.1 Plywood packages shall be marked with labels.

3.7.2 Two labels shall be affixed to the left edge of each longitudinal lining of each plywood package.

3.7.3 The labels are marked 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 of panels in a package
- plywood brand;
- plywood grade;
- plywood surface type;
- number of panels in a package, volume;
- film used for cladding, g/m² (for coated)
- date of manufacture;
- barcode with the identification number of the plywood package;
- conformity certification information;
- Keep Dry marking;
- additional marking for export and as requested by the customer;
- reference to these Specifications.

Marking on each plywood panel is applied only upon the request of the consumer.

3.8 Packing

3.8.1 The plywood panels shall be separated into packages by brands, grades, dimensions, types of surface finishing.

3.8.2 The plywood packages packing must ensure that plywood remains safe and intact during transportation. The packages shall be stacked on pallets or plywood panels with minimum thickness 15 mm and strapped with a packing strap.

Different types of packaging are allowed.

4 SAFETY AND ENVIRONMENTAL REQUIREMENTS

4.1 Environmental protection requirements

4.1.1 E0,5/E1 emission class plywood has no adverse effect on health and environment during its use, transportation and storage.

4.1.2 The content levels of hazardous chemicals released into the air of residential and public buildings during the use of plywood-based products into the air must comply with the requirements stated by the national sanitary and epidemiological surveillance authorities

- HS 2.1.6.1338-03 Threshold limit value (TLV) of harmful substance in the atmospheric air of populated areas;

- HS 2.1.6.2309-07 Safe reference level of impact (SRLI) of harmful substance in the atmospheric air of populated areas. Hygienic standards. Hygienic standards.

4.1.3 Plywood must be manufactured using materials and components cleared for use by national sanitary and epidemiological surveillance authorities.

4.1.4 Plywood does not contain any materials or components classified as hazardous waste.

4.1.5 The permissible level of specific activity of cesium-137 radionuclides in plywood (the radiation safety indicator must comply with the standards stated by national sanitary and epidemiological surveillance authorities).

4.2 Fire safety requirements

4.2.1 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 the fire safety rules.

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

4.2.3 Materials, used for film-faced birch plywood manufacturing are not explosive.

4.2.4 Production facilities used for film-faced plywood manufacturing and application have B class of fire rating.

4.3 Occupational safety requirements

4.3.1 The film-faced 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.

4.3.2 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.

4.3.3 Persons, involved in plywood manufacture must have personal protection devices as prescribes GOST 12.4.011.

4.3.4 Maximum permissible airborne concentrations of volatile substances at workplaces in plywood manufacturing and storage facilities shall be controlled in accordance with GOST 12.1.005-88.

5 OPERATING RECOMMENDATIONS

5.1 Plywood SEGEZHA FLEX PLY is designed for multiple use. Compliance with the rules of transportation, storage and formwork will increase its service life.

5.2 A slight deviation in thickness of the plywood at the distance up to 50 mm from the edge when exposed to wet air during transportation is permitted.

5.3 Plywood sawing into parts must be made using belt or circular saws.

In order to obtain a clean cut, sawing must be performed correctly: at first the sawing is to be carried out across the face grain direction, then along. This method allows you to avoid splitting the corners and reduce the size and number of chips on the surfaces.

When sawing with a round saw, high speed and low feed coefficient are recommended.

In case of sawing in order to prevent the moisture absorption by plywood, the edges are to be treated with special types of water-dispersion paint based on acrylate or other sealer.

5.4 All the holes done during installation should be filled with water-dispersion paint based on acrylate or other sealer in order to exclude moisture ingress into the plywood, and the panel

surface is recommended to be treated with a water-repellent composition. It is necessary to leave a gap of 2-3 mm between the parts for moisture migration.

In order to obtain a hole with smooth edges, it is recommended to use a sufficiently sharp drill, equipped with a front cutter.

It is necessary to begin drilling since the front side. In order to avoid splitting on the reverse side of the panel, it is recommended to use a lining sheet.

In order to avoid splitting of plies when using nails, it is recommended to use threaded nails or special screws. The recommended distance from the panel edge to a nail is 12 through 15 mm.

5.5 Rippling is represented by usual undulating bulges on the surface of plywood SEGEZHA FLEX PLY coated up to about 0.9 mm high and of various lengths, caused by the woodworking technology and the properties of wood material. They arise due to water absorption by plywood.

Especially often these phenomena are observed when using plywood in direct contact with water. When used indoors, abrupt changes in climate during the day or seasonal rainfall conditions (e.g., spring-autumn months) can also affect on appearance of the Rippling effect. The method for determining waviness on plywood surface is specified in clause 7.30.

The formation of waviness continues until complete saturation with moisture up to about 28% through the cut edges, edges without additional protection with sealers, drilled holes, rivets installed or damage of the coating invisible at the naked eye inspection. After complete saturation, the waviness of the plywood surface almost completely disappears. As a rule, this happens after (2-3) cycles of plywood with water and drying between each contact.

5.6 Under longstanding use, the moisture content of plywood increases significantly, which reduces its strength characteristics. In this regard, it is necessary to dry the plywood. In order to avoid external deformations, drying of plywood must be carried out in a natural way.

5.7 After completion of the formwork, the surface of the plywood should be cleaned from the concrete mixture remnants.

5.8 The parts made of plywood should be fastened using galvanized screws or stainless steel with round heads. It is recommended to perform pre-drilling of holes. Gaps and notches for fastening must be filled with the elastic mastic or paint. The recommended distance between the screws is the following: along the edge of the part from 200 through 300 mm; in the center of the part from 300 through 500mm; the distance from a screw head to the edge of the part must be at least 10 mm.

5.9 Parts of the plywood are to be fixed on all four sides, without sagging.

5.10 Parts made of plywood should be stored, preventing contact with the ground.

5.11 Unpacking of packages must be performed manually so as not to damage the edges surfaces and corners of the parts.

5.12 Panels or parts must be moved only on a pallet, in order to avoid fractures and cracks. Do not move parts without packaging around the production site using mechanical equipment, as they are extremely slippery. Manual movement is allowed only in the vertical position.

5.13 Minor damage of the overlaying film can be restored first by grinding, and then apply waterproof paint to the damaged surface.

6 ACCEPTANCE RULES

6.1 Plywood is accepted as batches.

6.2 The batch is a quantity of plywood panels of the same mark and emission class manufactured during the same working shift.

6.3 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 information;

6.4 At least one package of a batch shall be selected randomly for dimensional and appearance checks.

6.5 The batch is accepted if the number of checked panels with non-conformities to clauses 3.1.8, 3.1.10, 3.1.11, 3.1.13, 3.1.14 of these Specifications is less than or equal to 5% of the total number of panels, provided that the requirements of the clauses 3.4, 3.5 are complied with.

6.6 If the requirements of clause 6.5 are not complied with, the sampling shall be doubled. Test results are applied to the whole batch. If the requirements of clause 6.5 are still not complied with, the whole batch is classified as non-conforming.

6.7 The stress-related parameters of plywood shall be controlled once per 12 hours. Besides, the stress-related parameters for each type of plywood depending on thickness and number of plies shall be controlled at least once a month.

The stress-related parameters of SEGEZHA FLEX PLY coated, indicated in Table 4 of paragraphs 14-18 shall be controlled one time per a month.

6.8 The formaldehyde emission shall be controlled 4 times per 7 days by the gas analysis method.

7 CONTROL METHODS

7.1 Sampling for the stress-related tests is performed in accordance with GOST 9620, EN 326-1. Sampling for the formaldehyde emission testing by the gas analysis method is performed in accordance with GOST 30255, GOST 32155, EN ISO 12460-3. Sampling for determination of the formaldehyde content is performed in accordance with GOST 27678.

7.2 The length and width of a plywood panel are measured in two points parallel to edges at the distance of min. 100 mm from the 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.

7.3 The thickness shall be measured at the distance of min. 50 mm from edges and in the center of each panel side, i.e. in total in 8 points, 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 eight measurements. The thickness variance for a single plywood panel shall be the difference between the maximum and minimum measured thicknesses of eight measurements.

7.4 The squareness check is performed using a precision square according to GOST 3749. The out-of-squareness is determined as a deviation between the edge of the panel and the side of the precision square with a ruler according to GOST 427 with precision of 1mm, as described in EN 324: Part 2, GOST 30427.

7.5 The appearance check is performed by a visual inspection.

7.6 The shear strength along the glue line is determined according to GOST 9624, EN 314 Parts 1,2.

7.7 The bending strength and modulus of elasticity are determined according to GOST 9625, EN 310.

7.8 The tensile strength is determined according to GOST 9622.

7.9 The formaldehyde emission is determined according to GOST 32155, EN ISO 12460-3

7.10 The formaldehyde content is determined according to GOST 27678.

7.12 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 by a clearance gauge according to GOST 8925, with an accuracy of 0,1 mm - according to EN 324: part 2.

7.13 The moisture determination is carried out according to GOST 9621, EN 322.

7.14 The density determination is according to GOST 9621-72, EN 323.

7.15 Wood faults and process-induced defects are evaluated according to GOST 30427 and GOST 2140.

7.16 The bonding strength of the film coating is determined according to GOST 14614 by cutting the surface of the plywood samples to the depth of the film coating in two intersecting directions at an angle of 45 degrees. Then produce a visual inspection of the tested sample.

7.17 The steam resistance is determined in accordance with Guidelines 2.2-006 “Film-faced plywood testing”. Evaluation of the sample damage is made visually according to the scale from 1 to 5 scores, the permissible indicator is 1-3 scores.

7.18 The resistance to sodium hydroxide (NaOH), hydrochloric acid (HCl) is checked in accordance with Guidelines 2.2-006-2015 “Film-faced plywood testing”. Evaluation of the test result is made visually by changing the color of sodium hydroxide. Acceptable color from light yellow to colorless.

7.19 The resistance to cement is tested in accordance with Guidelines 2.2-006 “Faced plywood testing”. Evaluation of the change in cement color is made visually on a scale from 1 to 5 points, the permissible indicator is 1-3 scores.

7.20 Determination of roughness is carried out according to GOST 15612.

7.21 The sound absorption factor is determined according to GOST 16297.

7.22 The impact viscosity in bending is determined according to GOST 9626.

7.23 The sound insulation is determined according to GOST 27296.

7.24 The hardness is determined according to GOST 9627.1

7.25 The biological stability is determined according to GOST 34034, EN 1099.

7.26 The flammability classification is determined according to GOST 30244 and GOST 12.1.044.

7.27 The thermal conductivity ratio is determined according to GOST 7076.

7.28 The water vapor transmission resistance ratio is determined according to GOST 25898, ISO 12572:2001

7.29 Water permeability is determined according to Guidelines 2.2-006

7.30 The method for determining waviness of plywood surface (Rippling test)

The tests are carried out with the help of:

- drill bit with a diameter of 1 mm;

- aluminum adhesive tape, acrylic water-dispersion paint, wax.

Two samples of 100x100 mm in size are cut out of one plywood panel. It is allowed to use other sample sizes, provided that the dimensions will not affect the test result. Both sides of the sample (top and bottom) shall be tested. The samples conditioning is not required. Before the test, the ends of the samples are sealed with aluminum tape, acrylic water-dispersion paint or wax.

Testing results evaluation procedure

1. On the surface of plywood samples, 9 punctures shall be done with a drill to the depth of thickness of the facing coating and the outer layer of plywood.

2. The samples with the punctures are covered with a damp cloth and left for 2 hours, periodically wetting the cloth.

3. The testing surface is subjected to visual inspection and measurements of waviness (rays) near the punctures with a measuring ruler or tape measure according to GOST 7502. The test result is considered to be an arithmetic mean of the results of 9 measurements.

8 TRANSPORTATION AND STORAGE

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

8.2 Plywood is stored in horizontally stacked packages on bottom pallets or wooden blocks indoors at the temperature ranging from minus 40° to plus 50° and the 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.

8.3 High humidity and temperature variations may cause swelling in thickness, surface damages, as well as internal stresses and eventual delamination of plywood. A slight deviation in thickness of the plywood under the influence of air with humidity exceeding 80 % along a panel edge is permitted.

The plywood swelling in the radial direction of max. 6.5%, in the plane of max. 0.02% per 1% of change in humidity is allowed.

9 MANUFACTURER'S GUARANTEE

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

9.2 The warranty period of plywood is five years from the date of receipt by the consumer.

9.3 When subjecting plywood to further processing, it is recommended to contact the manufacturer to clarify the properties and characteristics of plywood.

Annex A
(mandatory)

Standards for defects limitations of grades of SEGEZHA FLEX PLY plywood coated

Defect	Standards for defects limitations of plywood grades		
	I	II	III
1 Delamination or absence of film coating	Max. 3 mm along one edge with under condition of painting	Max. 2 % of the panel area under condition of painting	Permitted
2 Film overlays	Max. width is 10 mm, max. length is 500 mm, in max. amount of 1 pc. / m2.	Permitted	Permitted
3a Traces of defects and malformations of inner layers: loose knots, holes (whitish spots)	As spots without signs of film destruction with size 25x25 in amount of 5 pcs per a panel with size 1250x2500 mm and 6 pcs per a panel with size 1500x3000 mm;	Permitted	Permitted
3b Traces of defects and malformations of inner layers: open splits, cracks (whitish stripes)	Max. width is 5 mm, max. length is 300 mm, in max. amount of 1 pc. / m2.	Permitted	Permitted
4 Glued pieces of film on surface (secondary laminat)	Max. size is 30x30 mm in max. amount of 1 pc./ m2 or 10x100 mm in max. amount of 1 pc./ m2	Permitted	Permitted
5 Temperature stains	Not permitted	Permitted without destruction of film integrity	Permitted
6a Burned film (burnout) due to defects of outer layers: cracks, damages, loose knots	Not permitted	Permitted	Permitted
6b Burned film (burnout) due to defects of outer layers: rough peeling	Not permitted	Permitted	Permitted
6c Burned film (burnout) due to defects of outer layers: strips and stains caused by sanding	Not permitted	Max. 25 % of a panel surface	Permitted
7 Traces of joint (seam) of veneer (darkening)	Permitted if facing coating is not damaged	Permitted	
8 Film strips and spots	Max. 15 % of a panel surface	Permitted	
9 Local blisters of film	Not permitted	Permitted with max. diameter 100 mm in max. amount of 1 pc./ m2	Permitted
10 Dents	Permitted shapes: round with max. diameter 6 mm in max. amount 1 pc. / m2; a long cavity with dimensions, mm, 30 × 3 in max. amount of 2 pcs. on the panel surface	Permitted	Permitted
11 Imprints of press hot plates and waste	Max. 5 % of a panel surface	Permitted	

Defect	Standards for defects limitations of plywood grades		
	I	II	III
12 Scratches	Not permitted	Permitted	Permitted
13 Shortage of veneer in inner layers	Not permitted	Along one edge of a panel with max. depth 5 mm	Permitted
14 Paint drips on a panel surface	Max. width is 5 mm	Permitted	
15 Traces of sound knots, patches, face veneer flaws (curly grain, dip grain, dark eyes, inbark, group veins) on face layers	Permitted		
16 Imprints of waste	Not permitted	Permitted	
17 Local delamination of a plywood panel (bubbles in inner layers of plywood)	Not permitted		
18 Warping	Not regulated		
19 Trimming defects: chips, caused by the saw, scoring saw traces	Max. length is 3 mm under condition of painting	Max. length is 10 mm under condition of painting	Permitted
20 Cracks in the outer layers	Permitted if facing coating is not damaged	Permitted	
Note: 1 The processing defects not specified in Annex A are not permitted. 2 The limits stated in Annex A are applied to one side of a panel.			

Annex B
(mandatory)

Standards for limitations of wood flaws and processing defects for outer layers of plywood
SEGEZHA FLEX PLY uncoated

No.	Veneer defects	Veneer grade			
		grade I (B)	grade I (S)	grade II (BB)	grade III (CP)
1	2	3	4	5	6
1	Pin knot - a sound intergrown knot of not more than 3 mm in diameter	Permitted			
2	Sound knot – knot free from rot. Intergrown knot - a knot, the annual growth layers of which have grown together with the surrounding wood for a length of not less than 3/4 of the cut knot perimeter. Light knot – sound knot having light-colored wood similar to the color of the surrounding wood. Dark knot – sound knot having dark, frequently irregularly colored wood which is considerably darker than the surrounding veneer	Light knots with a diameter up to 10 mm are not taken into account. Permitted with a diameter up to 20 mm with cracks of up to 0,5 mm width, max 3 knots per 1 sq.m.	Permitted with a diameter up to 25 mm, max 10 knots per 1 sq.m. with cracks of up to 1 mm width	Permitted: knots with cracks of max 1,5 mm width	
3	Partially intergrown knot – a knot, the annual growth layers of which have grown together with the surrounding wood for a length of 1/4 to 3/4 of the cut knot perimeter	Permitted: max 3 knots per 1 sq.m. of up to 6 mm in diameter	Permitted: max 10 sound knots per 1 sq.m. of up to 15 mm in diameter		
4	Dead knot – knot having fibres intergrown with those of the surrounding veneer to the extent of less than 1/4 of its cross-sectional perimeter or non-adhering knot. Loose knot – knot non-adhering to the surrounding veneer and hanging loosely. Knot holes . Worm holes - holes or channels made by insects or their larvae.		Permitted: max 6 knots per 1 sq.m. of up to 6 mm in diameter	Permitted: max 10 knots per 1 sq.m. of up to 6 mm in diameter	
5	Checks (closed) – separation of the fibers max 0,2 mm wide	Permitted: max 2 checks per 1 m of panel width, max 200 mm long	Permitted: max 2 checks per 1 m of panel width, max 300 mm long	Permitted	

6	Splints - separation of the fibers of 1 mm wide and more	Not permitted	Permitted: max 2 splints per 1 m of panel width, max 200 mm long, max 1 mm wide	Permitted: max 2 splints per 1 m of panel width, max 200 mm long, max 2 mm wide, provided that the splints are patched	Permitted: max 2 splints per 1 m of panel width, max 600 mm long, max 2 mm wide
7	Light inbark - (inbark is a dead-tissue trunk surface region grown over with wood with an outgoing radial crack) inbark having the wood of the similar color than the surrounding veneer without bark	Permitted			
8	Dark inbark – inbark having the wood of a much darker color than the surrounding veneer and/or having bark inclusions	Permitted: in the total quantity and with the norms of dead knots	Permitted: in the total quantity and with the norms of sound knots		
9	Grain imperfections: wavy grain – grain deviations across and along the panel. Curly grain – curved or chaotically positioned grain. Burl – local warping of growth layers due to knotting or inbark. Dark eyes – spots left by shrunken buds of max 5 mm in diameter having the wood of a much darker color than the surrounding veneer. Eye clusters	Permitted			
10	Natural discoloration: - False heartwood – discoloration of trunk, comes in various shades, intensity and pattern, without affecting wood hardness. Occurs in a growing tree, is generally dark brown or red. False sapwood – a growth layers around the heart similar in coloring and properties to sapwood.	Not permitted	Permitted: max 25% of the panel surface	Permitted: max 75% of the panel surface	

11	<p>Natural discoloration: Discoloration streaks – mottle as thin yellowish-brown strips of soft tissue at the boundaries between annual growth layers. Overgrown traces of damages in the cambial layer of wood by the larvae. Mottle – spotty and streaky hardwood sap discoloration without affecting wood hardness, which occurs in growing trees and which is of the similar color as the heartwood.</p>	Permitted: max 3 streaks or spots per 1 sq.m. of up to 150 mm long, up to 4 mm wide	Permitted: max 15% of the panel surface	Permitted: max 30% of the panel surface	Permitted
12	<p>Natural discoloration: Streak clusters</p>	Permitted: max 1 streak cluster per 1 sq.m of 60×40 mm size	Permitted: max 15% of the panel surface	Permitted: max 30% of the panel surface	Permitted
	<p>Natural discoloration: Red stain – surface (up to 5 mm deep) reddish-brown or bluish-brown color, resulting in wood due to oxidation of tanning substance.</p>	Not permitted	Permitted: no more than 200 mm long and in an amount of not more than 4 defects per 1 sq.m.		Permitted
13	<p>Chemical discoloration: brown stain – abnormally colored brown sapwood regions of varying hues, intensity and distribution. Occurs in felled wood during storage. Blue stain – bluish or greenish grey discoloration of the sapwood. Dark sapwood stains of fungal origin – abnormally colored darker sapwood spots obscuring wood texture without affecting hardness. Light chemical discoloration - chemical discoloration, coloring wood in pale tones without obscuring wood texture. Colored sapwood stains - orange, yellow, pink (up to light violet) and brown discoloration of sapwood.</p>	Permitted: max 10% of the panel surface	Permitted: max 50% of the panel surface		Permitted

14	Abnormal discoloration: discoloration with partial destruction of the wood: fungal stains (stripes), dark sapwood stains of fungal origin.	Not permitted			
15	Decay – abnormally colored wood regions with decreasing hardness as a result of wood-destroying fungal activity.	Not permitted			
16	Scratch – surface damage by a sharp object in the shape of a narrow and long hollowing; may be left by harvesting equipment. Dent – local impression on the surface layer. Ridge – a region of unprocessed surface of wood assortment in the shape of a narrow strip protruding above the processed surface due to a defect in the cutting edge of the tool.	Not permitted		Permitted within the values of thickness limit deviations	
17	Breaking out of grain (tearout) – a dent on the plywood surface as a result of local wood removal during processing (rough peeling)	Not permitted		Permitted: max 5% of the panel surface	Permitted: max 15% of the panel surface
18	Bark patch – bark and phloem patch remaining on the veneer surface	Not permitted			
19	Wood inlay patch	Not permitted	Permitted: max 1 patch per 1 sq.m	Permitted: max 8 patches per 1 sq.m	Permitted
20	Double wood inlay patch	Not permitted		Permitted: max 1 patch per 1 sq.m	Permitted: max 2 patch per 1 sq.m
21	Mechanical damage	Permitted: in the total quantity and with the norms of dead knots			
22	Process-induced spots – water stains, traces of joists, traces left by harvesting equipment	Not permitted	Permitted: max 5% of the panel surface	Permitted: max 10% of the panel surface	Permitted
23	Trace left by veneer peeling process – a strip with a color tint different from the color of the veneer without changing the surface structure	Not permitted	Permitted: up to 5 mm wide		Permitted

24	Incision – local damage by a sharp object	Permitted: in the total quantity and with the norms as indicated in clause 3 hereof			
25	Overlap in face veneers	Not permitted		Permitted: max 1 overlap per 1 m of panel width, max 100 mm long, max 2 mm wide	Permitted: max 2 overlaps per 1 m of panel width, max 200 mm long, max 2 mm wide
26	Glue stain (penetration)	Not permitted	Permitted: max 1% of panel surface	Permitted: max 2% of panel surface	Permitted: max 5% of panel surface
27	Warping	Not regulated			
28	Air bubbles, delamination	Not permitted			
29	Lack of veneer, panel edge defects due to clipping and sanding	Permitted: max 2 mm wide		Permitted: max 5 mm wide	
30	Sanding through	Not permitted			Permitted: max 1% of panel
31	Rippling (for sanded plywood), woolly grain, wrinkling	Not permitted		Permitted: if slight	Permitted
32	Surface roughness	Roughness parameter Rm according to GOST 7016, μm, max: for sanded plywood - 100, for non-sanded plywood - 200			
33	Glued-in veneer patches	Not permitted			Permitted: max 1 per panel, max 150 mm long, max 30 mm wide
Notes					
Limit for processing defect "Lack of veneer" refers to the inner layers of plywood as well					

Table B.2

Face veneers grade	Maximum number of permissible wood faults and process-induced defects, pcs
I	3
II	6
III	9
IV	Wood faults and process-induced defects: no quantity limit. Dimensional restrictions: see cl. 3, 4, 6, 8, 18, 22,25, 28,29,30,33 of Table A.1

Annex B
(mandatory)
Terms and definitions of process-related defects

Defect process-related	Definition
Delamination or absence of film coating	Uncoated areas of the plywood panel surface
Film overlays	Local thickening caused by the film overlapping on the plywood surface
Traces of defects and malformations of inner layers (whitish spots and stripes)	Stains and stripes on the film surface caused by defects in the inner layers, having a lighter shade, without damaging the film
4 Glued pieces of film on surface (secondary laminat)	Glued film pieces that got on the outer surface of the plywood during the overlaying process
5 Temperature stains	Discoloration of the film (with damage of the coating integrity and/or without damage) due to premature curing of the film without pressure
Rough peeling	Closely located small depressions on plywood surface, formed as a result of local removal of wood during peeling.
Changes of surface structure in a form of spots and points, film powdering, film crumbling (burned film)	Damage of the film integrity
Stripes and spots caused by film	Abnormally colored areas of plywood coating caused by release of volatile substances of the film during pressing
Local blisters of film	Partial detachment of the film from the plywood surface
Dents	Local indentation of the outer layer without damaging the film coating
Scratches	Damage of the plywood coating with a sharp object in the form of a long and narrow cavity or local indentation of the outer layer with damage of the film coating
Traces of sound knots, patches, face veneer flaws on face layers	Outlines of sound knots, structure of wood fibers, patches on the birch plywood surface
Paint drips on a panel surface	Getting paint on the surface of the plywood panel
Shortage of veneer in inner layers	A defect characterized by absence of part of the inner layer veneer, except for end knots and cracks
Imprints of waste and press plates	Local swellings on the plywood surface, formed due to the presence of defects on the hot plates of the overlaying press; strips from the press plates are strips and stains on the film-faced surface of plywood due to dirty press plates

